Products finishing

CLEANING
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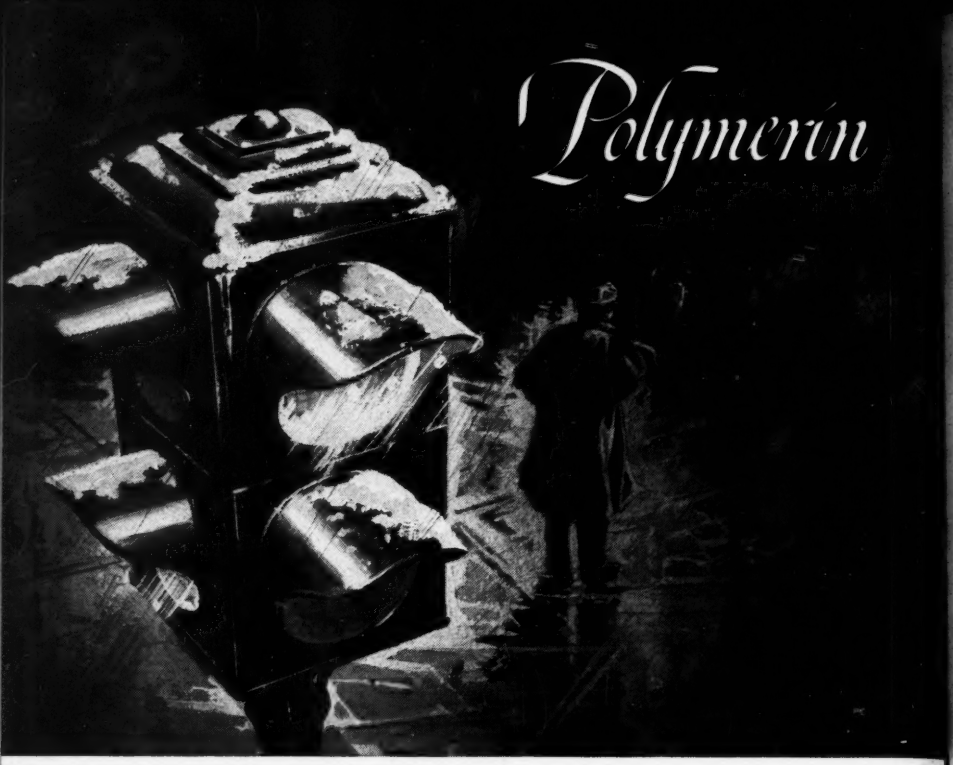
APRIL ▪ ▪ ▪ ▪ ▪ 1948



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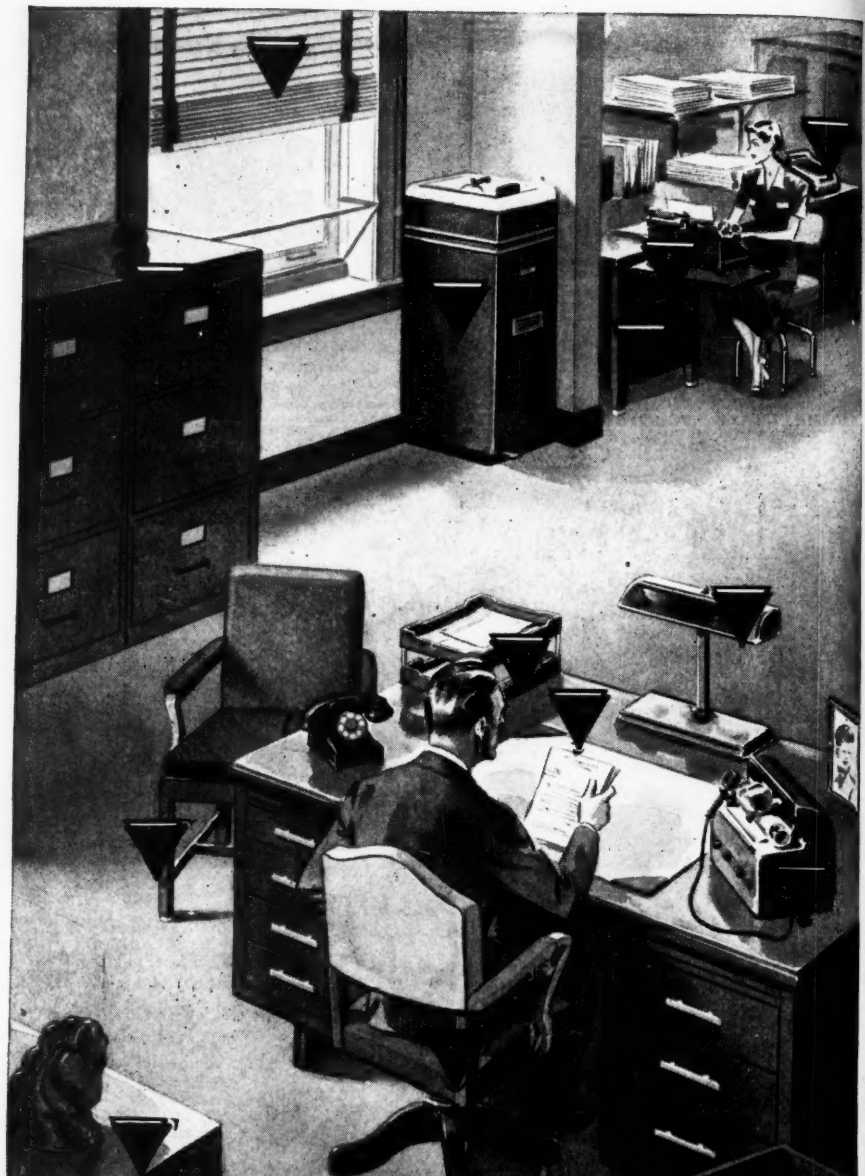


PRODUCTS finishing

Introducing Ezra A. Blount

WITH this issue we have the pleasure of introducing Mr. Ezra A. Blount as the new Editor-in-Chief of PRODUCTS FINISHING. Mr. Blount began his career in Chemical Engineering at the University of Cincinnati. As a cooperative engineering student he worked as chemist at the Indiana Lamp Corp., Connersville, Indiana; American Steel and Wire Co., Cleveland, Ohio; and the U. S. Bureau of Standards, Washington, D. C.

Upon receiving his degree of Chemical Engineer in 1932, he accepted a position with the Crosley Corp. as a control and development engineer in the electroplating laboratory. In 1936 he joined the Chambers Corp., Shelbyville, Indiana, as engineer in charge of plating and polishing production, porcelain enameling processing and quality control. In 1942 he joined the Cummins Engine Co., Columbus, Indiana, as assistant chief metallurgist.

Entering the armed forces in 1942, he served in the Air Forces as assistant engineering officer, AAF Maintenance Division, Fairfield Air Service Command, Patterson Field, Ohio. He later was placed in charge of the manufacture and repair section, then the accessory section and finally the engine overhaul section. While at Patterson Field, he also served as chairman of the Civilian Employee Suggestion Committee. During his overseas tour of duty he served as aircraft maintenance officer on the staff of Air Division, Nanking Headquarters Command, Nanking, China.

EZRA A. BLOUNT

Following his separation from service with the rank of Lieutenant Colonel, he joined the Frigidaire Division, G. M. C., Dayton, Ohio, where he occupied the position of process engineer in the porcelain enameling department.

Mr. Blount conducted courses in electroplating at Ohio Mechanics Institute and has authored many papers on various phases of metal-finishing processes.

He holds memberships in the Engineering Society of Cincinnati, American Electroplaters' Society, National Association of Foremen, Reserve Officers' Association, and Air Reserve Association, and is a member of Tau Beta Pi, honorary engineering fraternity; Alpha Chi Sigma, professional chemical fraternity; and Scabbard and Blade, honorary military society. He is a registered professional engineer in the State of Ohio.

The background of technical knowledge and experience which Mr. Blount brings to PRODUCTS FINISHING will enable this magazine to serve its readers more efficiently in the future than it has in the past.

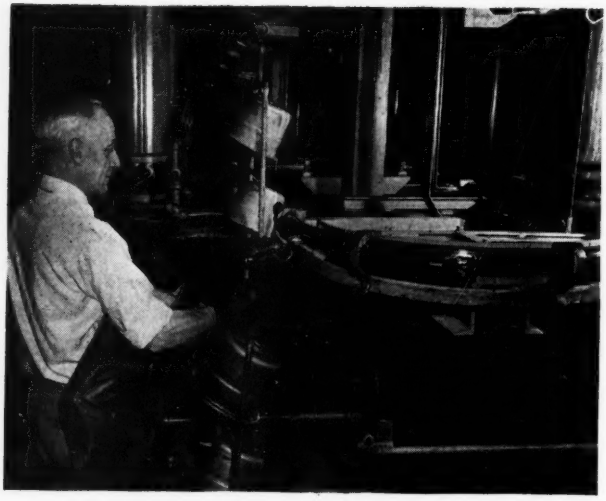


Fig. 1 — Loading a Udylite machine wherein steel and cast iron parts are pickled by the Bullard-Dunn process

By
HERBERT CHASE, M.E.

Ultra-Modern Plating Setups Employed at G.E. Plant

New plant manufacturing "all-automatic" washer utilizes latest equipment and processes for cleaning and applying bright zinc and hard chrome coats.

A COMPACT setup for the plating of steel parts on a large volume basis is a feature of a new General Electric plant devoted to the manufacture of the G. E. "All-Automatic" Washer for domestic consumers. A large number of the parts going into the production of this machine require plating and, since the plant has set up a high production schedule, the plating operations must be performed on an efficient, large volume basis.

Major units of the plating installation are four fully automatic Udylite plating machines of the latest type. One of these is employed for the Bullard-Dunn type of pickling cycle, one for

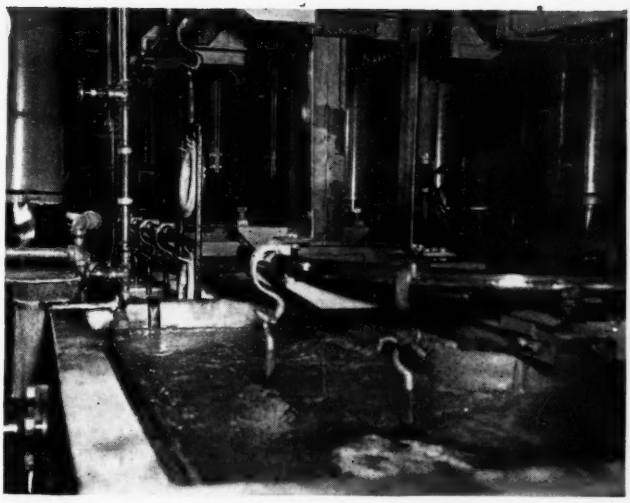


Fig. 2— View of one end of the cleaning machines showing a rack of parts emerging from the Bullard-Dunn tank at the left. The submerged racks in the foreground are being conveyed through a cold rinse tank.

bright zinc plating, and one for hard chromium plating. The fourth machine is designed for bright nickel plating but to date those minor parts of the washer that require nickel plating have been purchased already plated. This machine, however, can be adapted for other plating if necessary.

In addition to the machines for automatic plating, a compact and well arranged system is employed for the rapid bright zinc barrel plating of small parts. In this setup, the barrels are shifted from tank to tank by an electric trolley hoist.

Since many of the parts to be plated have been machined within limits of a few ten-thousandths of an inch, proper allowances must be made for not only controlling the thickness of plate applied but also to avoid significant dimensional changes in cleaning the parts. With the Bullard-Dunn process employed for the cleaning of parts prior to plating, the moment that

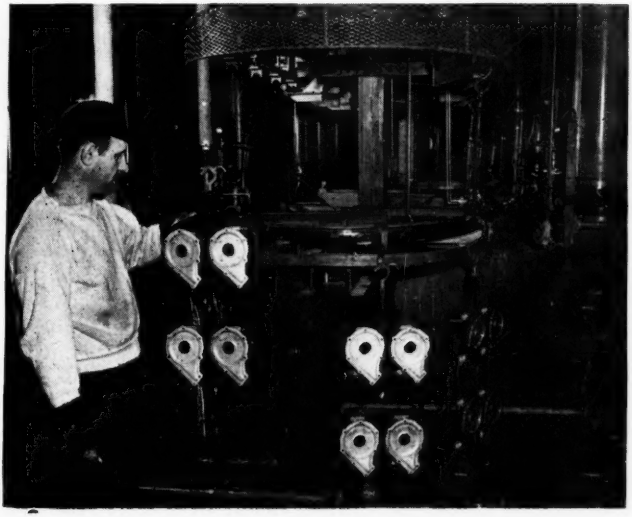


Fig. 3 — View of the loading end of the machine for bright zinc plating. Racks of parts are shown emerging from the drying tunnel at the left, while one newly loaded rack can be seen at the right.

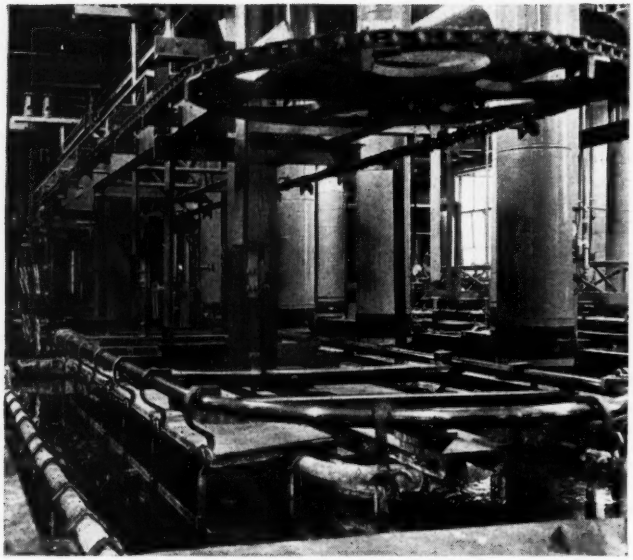


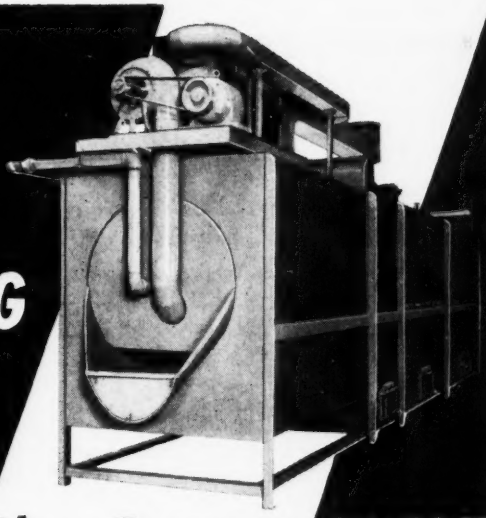
Fig. 4 — View of the outer end of the bright zinc plating machine, with the zinc plating tank in the foreground

scale or other oxide is removed in the acid bath and bare metal is exposed, tin is plated over the bare surface to prevent further attack (with a corresponding dimensional change) on the metal. Later in the process, the tin, only very thin coatings of which are applied, is stripped.

In the Bullard-Dunn machine, as shown in Fig. 1, the steel or cast iron parts, after racking, enter a tank containing an alkaline cleaner in a concentration of 12 to 16 oz. per gallon. The bath is heated to 190 deg. F. and reverse current is applied for two minutes at a potential of 6 volts. This anodic treatment is followed by a cold water dip-and-spray rinse, after which the racks of parts enter the Bullard-Dunn solution tank. In this tank, the electrolyte is a 10 per cent (by volume) solution of sulphuric acid, which is maintained at a temperature of about 150 deg. F. The current density is approximately 65 amperes per square foot. Most of the anodes are Duriron, with one or two tin anodes provided to supply the necessary tin. No steel or iron is removed by the pickle since the moment that oxides are removed, the tin plates the surface of the work. The work is left in the pickle tank 5 to 8 minutes, with no significant dimensional change resulting.

After a cold rinse, as shown on Fig. 2, the work enters a tank containing the same hot alkali solution as the first tank and is made anodic, the reverse current stripping off such tin as has been plated on previously. This leaves the work clean, free of both oxide and tin. After the parts are subjected to a cold dip-and-spray rinse and then a rinse in hot water (200 deg. F.), they enter the final tank where they are dipped in an oil emulsion maintained at 175 deg. F. The oil emulsion is applied to protect the parts against corrosion until they are ready for plating or for assembly. The total time required for the cleaning cycle is 20 to 25 minutes.

For bright zinc plating, the racked parts are hung on another conveyor, as shown in Fig. 3, and receive the same reverse current cleaning and cold dip-spray rinse as in the first two tanks of the line just described. The third dip is in a pickle made with equal volumes of muriatic acid and water, used cold, and requires one minute. This is



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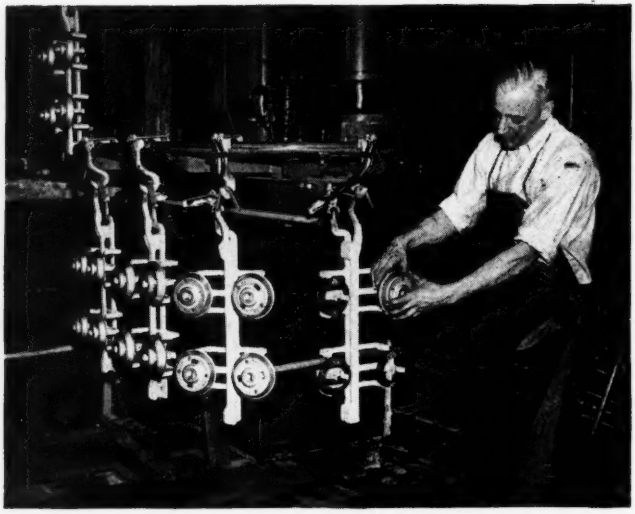


Fig. 5—Loading racks with cone clutch cups that are to be plated with hard chromium. Each rack has four perforated anodes which throw the plate against the inner conical surface of each part where the thickest coating is required.

followed by a cold rinse, after which the racks enter a 2,000-gallon tank, as shown in Fig. 4, for bright zinc plating in a solution of the following composition, plus a brightener:

Zinc _____4 to 5 oz. per gal.
Sodium Cyanide ___8 to 10 oz. per gal.
Sodium Hydroxide __9 to 11 oz. per gal.

Pure zinc ball anodes in steel containers are used and a 6-volt potential is applied, the bath being of room temperature. The current density is about 25 amperes per square foot and the plating time varies from 10 minutes to 1 hour, depending upon the thickness of plate specified for the particular parts in process. The plating is bright but the degree of luster varies, of course, with that of the parts when they enter the bath, as in other bright plating processes. No bright dip is used.

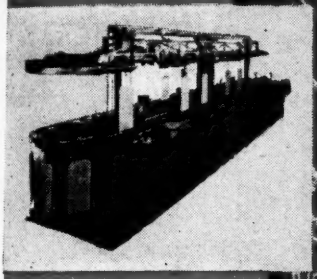
Plating is followed first by a cold and then by a hot rinse, after which the racks are conveyed through a tunnel in a forced draft of hot air so that they emerge dry at the end of the plating machine. At this point, the parts are deracked and the racks are refilled.

Hard chromium plating is performed primarily to provide the hard wear-resistant surfaces required on some parts, such as the stamped cone cup for a clutch. For this and for some other parts, the racks include anodes designed to throw the plate into recesses that otherwise would not receive an adequate coating in the plating time allotted. For the clutch cup, the anode, as shown in Fig. 5, is perforated and made conical so as to fit close to the recessed conical wearing surface where the primary need for plating exists.

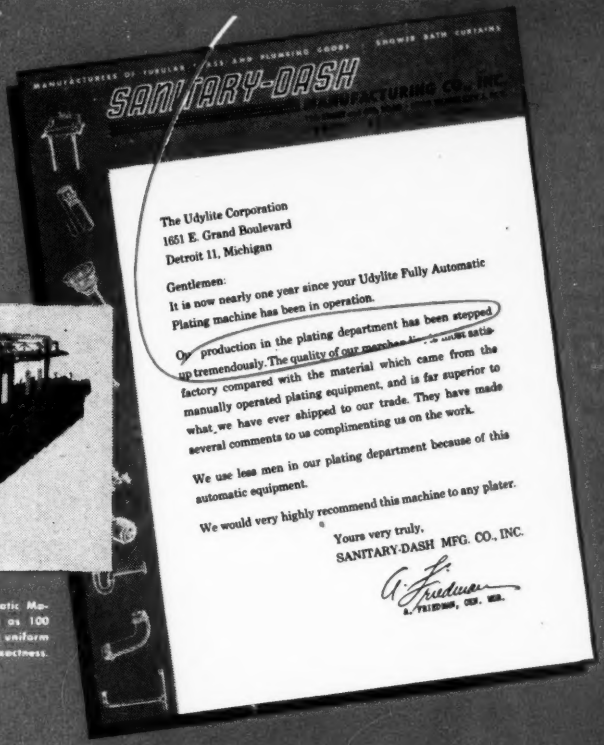
In the hard chromium plating installation, the first four operations and solutions are the same as for the bright zinc machine just described. In the fifth tank, however, reverse current is applied in a solution containing 25 oz. per gallon of chromic acid at 130 deg. F. The anodes are steel. The time that the work remains in this tank is only 15 seconds and the the potential is approximately 6 volts.

The work is next plated in a solution containing 33 oz. per gallon of chromic acid and 0.33 oz. per gallon of sulphuric acid. Anodes are antimonial lead. The temperature is held at 125 deg. F. and the average plating time is 30 minutes, during which a plate of about 0.0005

"...production in the plating department has been stepped up tremendously!"



This Udylite Fully Automatic Machine turns out as high as 100 racks per hour, producing uniform finishes to laboratory exactness.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Gentlemen:
It is now nearly one year since your Udylite Fully Automatic Plating machine has been in operation.
Our production in the plating department has been stepped up tremendously. The quality of our merchandise is much satisfactory compared with the material which came from the manually operated plating equipment, and is far superior to what we have ever shipped to our trade. They have made several comments to us complimenting us on the work.
We use less men in our plating department because of this automatic equipment.
We would very highly recommend this machine to any plater.
Yours very truly,
SANITARY-DASH MFG. CO., INC.

● Let Udylite Plating Machines and laboratory-tested supplies bring these important advantages to your operations! There is a Udylite machine for every need—small plant or mass-production line—small parts or large. Udylite will gladly analyze your operations, test your solutions, and advise you, entirely without obligation. Write *today*. The Udylite Corporation, 1651 East Grand Blvd., Detroit 11, Mich.

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inch average thickness is applied. Air agitation helps to keep the bath at the desired uniform temperature; however, all tanks have thermostatic control where such control is needed. The current density in plating is about 175 amperes per square foot.

To save chromic acid, the parts are dipped into a dragout rinse tank, and the solution is used for make-up in the plating tank into which the dragout is pumped automatically when a certain difference in level occurs. This dip is followed by a cold and then by a hot rinse to ensure that the parts are dry when they reach the unracking station.

Bright zinc barrel plating departs somewhat from the procedure employed in the automatic machine and, of course, is not automatically timed. In the first tank, the parts are given a short soak in alkaline cleaner mixed 12 to 16 oz. per gallon of water and heated to 190 deg. F. The soaking time varies with the type of part. This soak is followed by a cold rinse and then by a dip in a solution containing equal parts by volume of muriatic acid and water. Next comes another rinse, after which the parts are dipped in a solution of sodium cyanide and caustic soda to prevent rusting while the load is transferred from the Monel barrel, used up to this point, to a plastic barrel in which plating is done. A rack to facilitate this change-over is provided at the end of the aisle along each side of which the tanks are arranged, as illustrated in Fig. 6. This rack holds the Monel barrel on top and the Bakelite

Fig. 6—In this area, a bright zinc barrel plating cycle is followed. Cleaning tanks are illustrated at the left, while at the right in the far corner are two plating tanks. Next to these tanks are rinse tanks and at the right is a centrifugal dryer. The operator at the left is lowering a Monel barrel into one of the cleaning tanks.

The use of a special heavy type "SCOTCH" Tape for reinforcing rug seams solved a production problem for the Thermwell Products Company. The tape is used as a supplementary splice to reinforce the stitching. When the stitching wears out the tape holds the joint by itself. This service requires an adhesive of great holding power, an extremely tough backing, and a finish that will blend with the color of the reverse side of the rug.

There is a "SCOTCH" Tape for every phase of products finishing: Tough backing with low tack adhesive to protect the surface of stainless steel during fabrication; heavy backing and a tightly gripping adhesive for sandblasting; impervious backings for masking during the application of paint, lacquer and other finishes.

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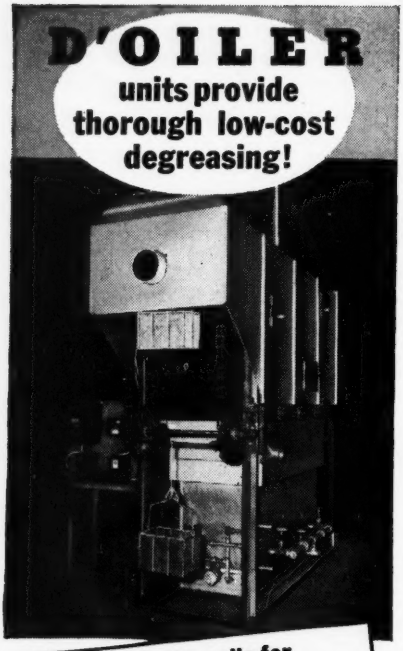

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Mechanical
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P. O. BOX 88, SOUTH ORANGE, N. J.

barrel near the bottom. A hopper between the two barrels facilitates rapid work transfer.

The work is now bright zinc plated in the following bath:

Zinc _____4.5 to 5.5 oz. gal.
Sodium Cyanide _____11 to 13 oz. gal.
Sodium Hydroxide ____10 to 12 oz. gal.

The plating operation is performed at 12 volts, the time varying from ½ to 4 hours, depending upon the part and the specification. Following the plating operation, the barrel contents are dumped into a tank having a hinged basket or perforated troughs submerged in cold rinse water. After the first rinse, the basket is turned about the hinge and the contents are thus dumped into a second cold rinse basket which, in turn, is emptied of its contents into a hot rinse tank from where the parts are finally emptied down a chute into spinner baskets for transfer to a centrifuge. The parts are dried in this equipment in approximately two minutes.

Barrels are handled by an electric hoist on a trolley and, when being loaded, are set in racks next to the first tank mentioned above. Since two plating tanks are used, two barrel loads can be plated at the same time. Means are provided for turning the barrels in the various tanks.

Copper and Brass Research Association Handbook. A 48-page handbook on the maintenance, cleaning, finishing, and coloring of copper, brass, and bronze has been announced by the Copper & Brass Research Association, 420 Lexington Ave., New York 17, N .Y. The handbook offers advice on the maintenance of copper and copper base alloys which are used for architectural ornamentation, building fronts, and various other utilitarian purposes. The handbook also discusses cleaning and finishing, and includes a chapter on coloring which contains color plates illustrating the results obtained from the various coloring solutions. Copy free upon request.

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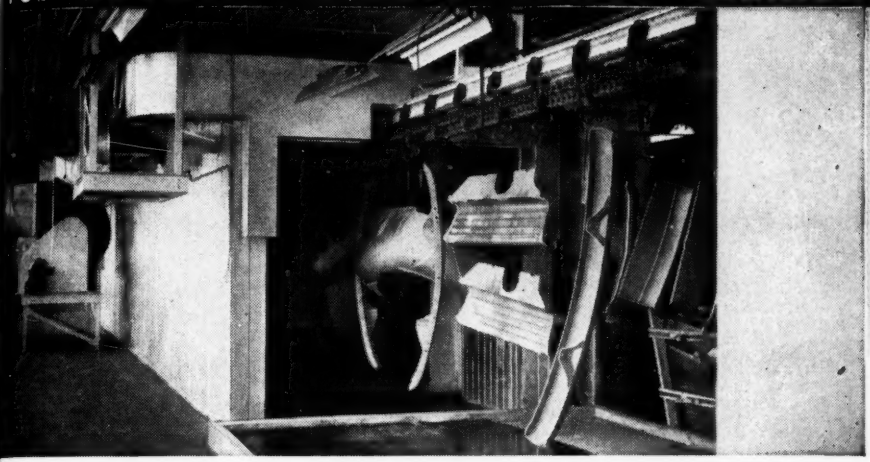

FORD TRUCK INSTALLATION

Here is another typical example of Mahon planning and engineering. This Complete Finishing System was installed by Mahon in the Ford Truck and Bus Plant under conditions of restricted head room and other restrictive physical characteristics of the building. Part of the system was installed in an open craneway to obtain an efficient operating layout. What Mahon has done in hundreds of manufacturing plants throughout the world, he is prepared to do for you also. If you are confronted now with a finishing problem involving new equipment, do not hesitate to call on Mahon engineers . . . remember, that twenty-seven years of experience in this highly specialized field, together with constant research and development, have endowed Mahon engineers with a wealth of technical knowledge and practical know-how not available to you elsewhere. See Mahon Insert in Sweet's Mechanical Industries File for complete information, or arrange consultation.

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AHON

Tennessee appliance builder obtains 10,000 square feet additional floo space by rebuilding two ovens on roof—old insulation 100 per cent reclaimable.

By RICHARD L. DAVIS
Secretary, Industrial Mineral Wool Institute
New York City

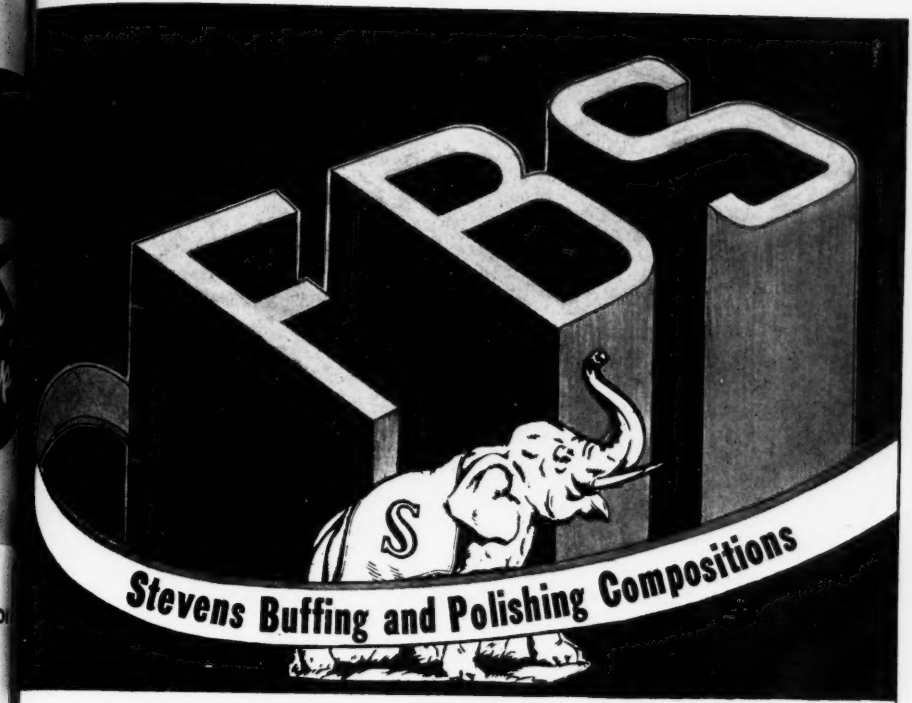
IN a recent program of increased production, the Cavalier Corporation of Chattanooga, Tennessee, effected an expansion of floor space and improvement of oven facilities at minimum cost by utilizing previously unused roof space, as shown in Fig. 1, and reclaiming the insulation from old ovens. Further savings in operating expenses were obtained through the use of TVA electricity as an oven heating medium.

Cavalier produces home appliances and vending machines which are finished in a wide variety of baked japans, paints, enamels, and synthetic finishing materials. The drying and baking of these finishes is a most important item in production cost.

A decision was made to dismantle two of the four ovens in use and reassemble them on the roof in order to provide greater floor space within the plant proper. At the same time, the company decided to improve oven capacity and characteristics.

The ovens used in the baking operations require close temperature con-

(Above) Fig. 1—Over 10,000 square feet of floor space were added to the Cavalier Corporation's facilities when two finish bake ovens were dismantled and reassembled on the plant roof. Ten to 15-year old mineral wool insulation was reclaimed and reused in the new installation.



Standard Methods—With Specifications for Stevens Buffing Compositions

In preparing the following over-all chart we have selected the particular grade of Composition most widely used on each operation. However, since there are many variable factors in all finishing jobs, such as sequence of operations, type and speed of buffs and wheels, methods of cleaning, and type and quality of finish required, the Complete Stevens Line includes a selection of grades in each class of product.

MATERIAL	POLISHING		BUFFING		FINISHING	
	On Set-up Wheels	On Buffs	Hand Buffing	Automatic Machine	*Bright (Mirror)	Semi-bright (Satin, etc.)
Aluminum						
Castings	#2 Tallow		#20 Tripoli	#12 Tr.	FC Colg.	M Greaseless
Forgings	#2 Tallow		#20 Tripoli	#2 D. D.	HL Colg.	F Greaseless
Stampings			#73 Tripoli	#12 Tr.	HL Colg.	F Greaseless
Brass						
Castings	#1 Tallow	M Greaseless	Reg. #1 Trip.	#10 Tr.	HL Colg.	M Greaseless
Forgings	#2 Tallow	F Greaseless	Marvel. Trip.	#3 Tr.	HL Colg.	F Greaseless
Stampings			Marvel. Trip.	#3 Tr.	HL Colg.	F Greaseless
Celluloid			Plasticut	#472 Colg.	Plasticolor	
Copper			#8 D. D.	#12 Tr.	HL Colg.	F Greaseless
Die Castings			#20 Trip.	#14 Tr.	FC Color	F Greaseless
Iron	#1 Tallow Stick and Emery Cake	C Greaseless	Colmore Tr.	#400 St.	#181 White	C Greaseless
Leather			#8 D. D.		HL Colg.	Tawpica Comp.
Pewter			#100 Tr.		AB Colg.	F Greaseless
Plastics						
Soft Types			Plasticut		Plasticolor	
Hard Types			Reg. #1 Tr.		#181 White	
Black Types			#16 Black		#16 Black	

MATERIAL	POLISHING		BUFFING		FINISHING	
	On Set-up Wheels	On Buffs	Hand Buffing	Automatic Machine	*Bright (Mirror)	Semi-bright (Satin, etc.)
Plated Surfaces						
Cadmium						
Chromium					White Rose #1823 Chr.	Brush Finish
Copper			#8 D. D.	#8 D. D.	HL #256	
Gold					Ace Rouge	
Lead					White Rose	
Nickel			FF #13 Lime	FF #14 L.	HL #258	Brush Finish
Silver					PX Rouge	Brush Finish
Tin					Crocus	
Zinc					White Rose	
Platinum			#28 X White		Green Plat.	
Rubber (Hard)			#16 Black	Reg. #1 Tr.	#16 Black	
Silverware						
Ni Silver			#12 Trip.	#180 Tr.	XL Rouge	Brush Finish
Sterling			#2 Trip.	#180 Tr.	12 X Rouge	Brush Finish
Steel						
Carbon	#1 Tallow Stick and Emery Cake	C Greaseless	#400 St.	#400 St.	#181 White	M Greaseless
Stainless	#502 Tallow	F Greaseless	#403 St.	#79 St.	#29 X White	F Greaseless
White Metal	#1 Tallow Stick		#8 D. D.		HL Colg.	

Where a line (.....) is drawn through a space, we do not specify any product because the operation is seldom, if ever, performed.

Under the heading "POLISHING" two alternative methods are suggested, either a "set-up" wheel, using either natural emery or artificial abrasive, set-up with glue or with STEVENS ABRASIVE CEMENT, and lubricated with Tallow Composition (many jobs, especially carbon steel or iron, also require Emery Cake or Emery Paste), or, as an alternative, Greaseless Composition applied to a buff or wheel, without lubrication.

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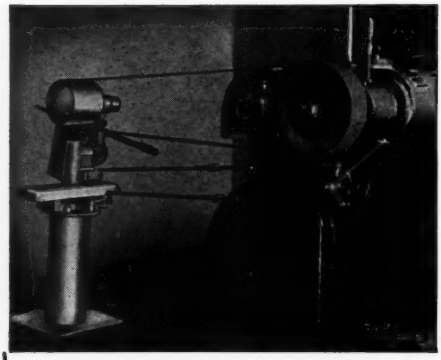
EVERYTHING FOR PLATING AND FINISHING

trol in order that finishes of maximum appearance and durability are obtained. Excessive heat causes blisters or destroys the bonding properties of the coatings. Insufficient heat results in tacky finishes—and rejects. In maintaining good temperature regulation, insulation has been found a vital factor, in addition to its principal purpose of saving fuel by reducing radiation losses.

The first oven at Cavalier was installed 15 years ago and was insulated with 4-inch granulated mineral wool. A second installation made some five years later was similarly insulated. Upon investigation, this insulation was found to be still in excellent condition despite 10 to 15 years of hard service, and a plan was formulated to reuse this mineral wool. Since Cavalier did not have proper blower equipment to install loose granulated mineral wool, supplemental wool was obtained and the whole compacted into home-made blankets backed with poultry netting. The exposed position of the rebuilt ovens necessitated the addition of 2 inches to the thickness of the insulation, resulting in a total of 6 inches of insulation in the walls and ceiling of the roof battery.

The durability of mineral wool insulation, as evidenced by its "good as new" condition after 10 to 15 years of use in ovens operating continuously between 230 and 500 deg. F., is but one phase of its valuable characteristics which Cavalier has discovered. Complete freedom from localized temperature fluctuations due to insulation failure through cracking, crumbling, decomposing through thermal or chemical action, or from packing has made possible uninterrupted operation, necessary for the economical production of mass produced items. No maintenance of insulation has been required in the ovens, and the ease with which the blankets can be removed and



DATA: Easily reversible to R.H. or L.H.; 5" side adjustment on Needle Bearings with Remote Control; Hydraulic Shock Absorber lowers weight slowly; easily tracks ¾" to 6" belts from Remote Control; Large Bearings Mounted in Arm for Lower Bearing Speeds, sealed for life with Non-Friction Grease Seals; Large Belt Length Adjustment; Counter Weighted for Steady Accurate Pressures.

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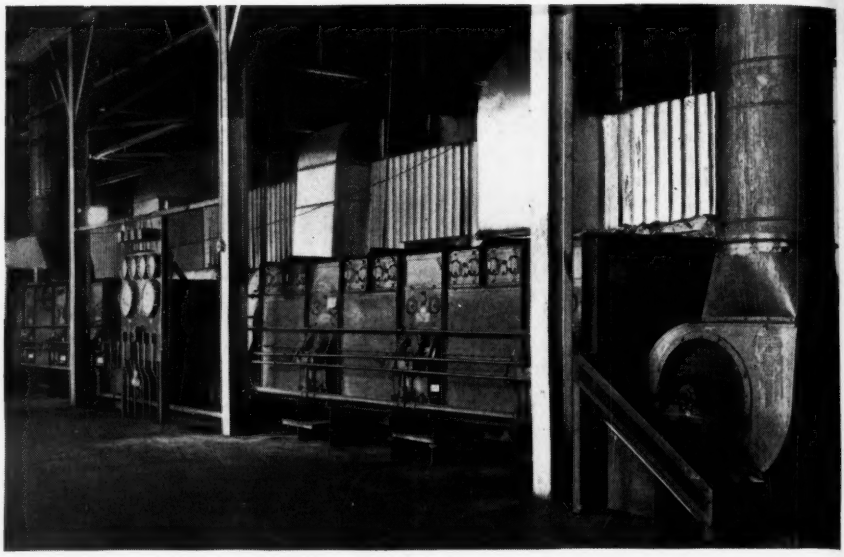

Fig. 2—This view of the interior finishing ovens at the Cavalier Corporation affords an idea of the space saved when similar units were moved to the plant roof. The oil-fired heaters in the foreground are used to recirculate warm air through the ovens.

replaced materially facilitates repair and replacement of oven panels or burner equipment when necessary.

One roof oven will be used for drying prime coats and the other for finish drying. The ovens are housed in a 20-gauge galvanized sheet iron paneled structure. Panels are firmly ribbed, crimped, and welded to prevent moisture penetration, as well as to strengthen the external shell. The roof prime coat oven is 30 x 120 x 8 feet and operates at a temperature ranging from 430 to 475 deg. F., depending on the type of coat being applied. The finishing oven is 50 x 120 x 8 feet and operates at a temperature ranging from 230 to 375 deg. F. Both ovens are contained in a common outer shell.

Heating of the roof ovens is accomplished by means of electric red heat resistor units located in the floor. This arrangement permits convenient acces to the units for replacement from the floor below and makes use of natural convection for heat circulation.

Conveyor lines are led up through the roof into the ovens. This setup results in nearly total exclusion of heat dissipation back into the work room—the tendency of heated air to rise almost completely overcoming heat radiation effect beneath the oven entrances. Overhead conveyor chains are used to carry the work through the ovens from cleaning and spray booths to the assembly and shipping rooms. The conveyors double back within the ovens—three times in the prime oven and five times in the finishing oven.

Referring to Fig. 2, the remaining interior ovens are similar to the roof ovens but are somewhat smaller, the prime oven being 30 x 100 x 7 feet and finish oven 45 x 100 x 7 feet. The operating temperatures are the same as those in the roof ovens, however, oil is used as a fuel.

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No deliberate distinction is made in the placing of work in either battery of ovens. However, at the present time, the electric units are being used for the production of an unusually high quality red Dulux finish on a type of refrigeration unit. Extreme care is required in producing a finish of not only unusual appearance but of complete freedom from porosity. The oil-fired ovens are being used to dry finishes on several types of unit heaters intended for home use.

The importance of obtaining uniform temperatures throughout the work zone of finish drying ovens is stressed. If striation of temperature occurs, variations in color and hardness may result. This is particularly true of synthetic types of enamels which use plastic base colors. To obtain a bright gloss on a true color, the temperature should be maintained within 5 deg. F. of the correct point. The control charts on the several ovens indicated somewhat closer control was actually obtained, due to the effective insulation of the ovens. Actual operation variances were approximately 2 deg. Fahrenheit.

The success of the exterior oven installation using reclaimed mineral wool and electric heating is expected to lead to similar future installations at Cavalier. Such installations are desirable since a minimum of building structure is required, increased production facilities are made available, and operating costs are at a minimum.

Divine Full Disc Buff Cloths. A catalog page containing ten samples of cloth used for making buffs has been issued by the Divine Brothers Co., 200 Seward Ave., Utica 1, N. Y. The various samples of cloth are glued on the page in such a manner that they can be readily examined. Beside each swatch is a brief description of the recommended use for that quality. Copy of Bulletin FDB-3 free upon request.

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Glycerine in Finishes for Metal Products

By GEORGIA LEFFINGWELL, PH.D. and MILTON A. LESSER, B.Sc.

DURING the last two decades, glycerine has become one of the principal raw materials used in the formulation of finishes for metal products. The importance of glycerine rests chiefly on its extensive use in the manufacture of synthetic resins, especially those of the alkyd types. According to authoritative reports, more glycerine is used in the production of alkyd type finishing materials than in any other metal finishing material.[1,2]

In the ceramic industry, glycerine's hygroscopicity or humectant action is probably its most important characteristic.[3] It is this ability to attract and retain moisture and so prevent excessive drying and brittleness which led Vielhaber to recommend its use in the production of colored vitreous enamels.[4] Advocating its use to replace oil and water, this authority pointed out that not only does glycerine keep the products moist and workable without affecting color or other properties but it also evaporates at the firing temperatures without leaving a carbonaceous residue or affecting the resistance or strength of the final product.

Non-oily vitreous enamels developed by Shurley for use on metals and other materials provide similar use for glycerine.[5] A typical preparation of this kind, as given in his patent, consists of:

Sodium silicate	20 parts
Glycerine	10 parts
Corn starch syrup	40 parts

Because the consistency of the mixtures can be adjusted as required, such combinations may be applied by spraying, brushing, or screening. One of the several advantages cited was their particular value in coating metals because of the improved adherent qualities of the mixtures for metal. This factor also permitted a number of coatings to be fired at one time. Also stressed was the fact that such non-oily vitreous combinations eliminate the cost of preheating and special handling.

Glycerine, as such, has been used as the plasticizer in simple varnishes, like the following for protecting polished copper objects:[6]

Sandarac	110 parts
Rosin	30 parts
Glycerine	5 parts
Alcohol	sufficient

Such utility is, however, of comparatively minor importance. Modern uses in protective and decorative coatings stem from chemical rather than physical characteristics. One of the most

[1] Rager, C. A.: "Glycerin, Synopsis of Information," U. S. Dept. of Comm., Ind. Ref. Service, 3: No. 47, Dec. 1945
[2] McConlogue, W. A. and Lenth, C. W.: Fats and Oils Situation, Feb. 11, 1944, p. 11
[3] Leffingwell, G. and Lesser, M. A.: Ceramic Ind. 35:37, Aug. 1940
[4] Vielhaber, L.: Emailwaren-Ind. 11:324, 1934
[5] Shurley, F.: U. S. Pat. 2,104,531, 1938
[6] Hiscox, G. D. and Sloane, T. O'C.: "Twentieth Century Book of Formulas," New York, Henley, 1938, p. 726

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important steps in paint formulation was the discovery that ester gums could be made by the chemical union of rosin with glycerine.[7] These ester gums, the first "synthetics" of the modern paint industry, found extensive use in the production of oleoresinous varnishes and nitrocellulose lacquers.

These gums were followed by other types of synthetic resins for paint manufacture. Of these, the alkyd resins are the most important today. As a group, these resins may be described as the reaction products of a polyhydric alcohol with a polycarboxylic acid; the most common pairs of chemical reactants being glycerine and phthalic acid (in the form of the anhydride).[8] These glyceryl phthalate and related alkyd resins are almost always modified by the use of oils, fatty acids, natural resins and, with growing frequency, by other synthetic resins. Thus, by the selection of the proper modifying agents it has become possible to formulate alkyd resins to meet an increasing number of requirements.

As a class of resins, the alkyds are outstanding for such properties as: retention of color and gloss under severe conditions, ease of application, ready solubility, varied compatibility, good film building, high gloss, excellent adhesion to metals and other surfaces, wide range of properties, and quick-drying.[9] Noting that alkyds provide the paint formulator with an excellent and most versatile group of resins with which to prepare protective and decorative coatings, Glaser[10] summarized the advantages of these resins as follows: "Finishes made from the proper alkyd resin bases possess excellent ad-

[7] Van Antwerpen, F. J.: Chem. and Eng. News 19:1255, 1941
[8] Ruthruff, R. F.: Chem. Ind. 58:241, 1946
[9] "Plastics Catalog," New York, Plastics Catalogue Co., 1944, p. 184
[10] Glaser, M. A.: Ind. Finishing 19:52, Oct. 1943

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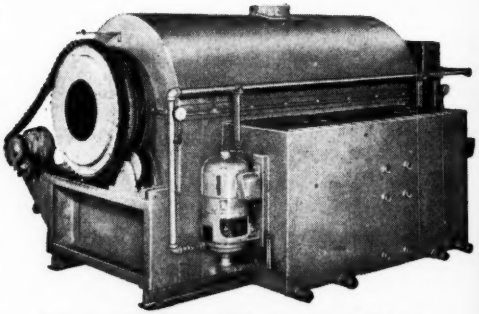

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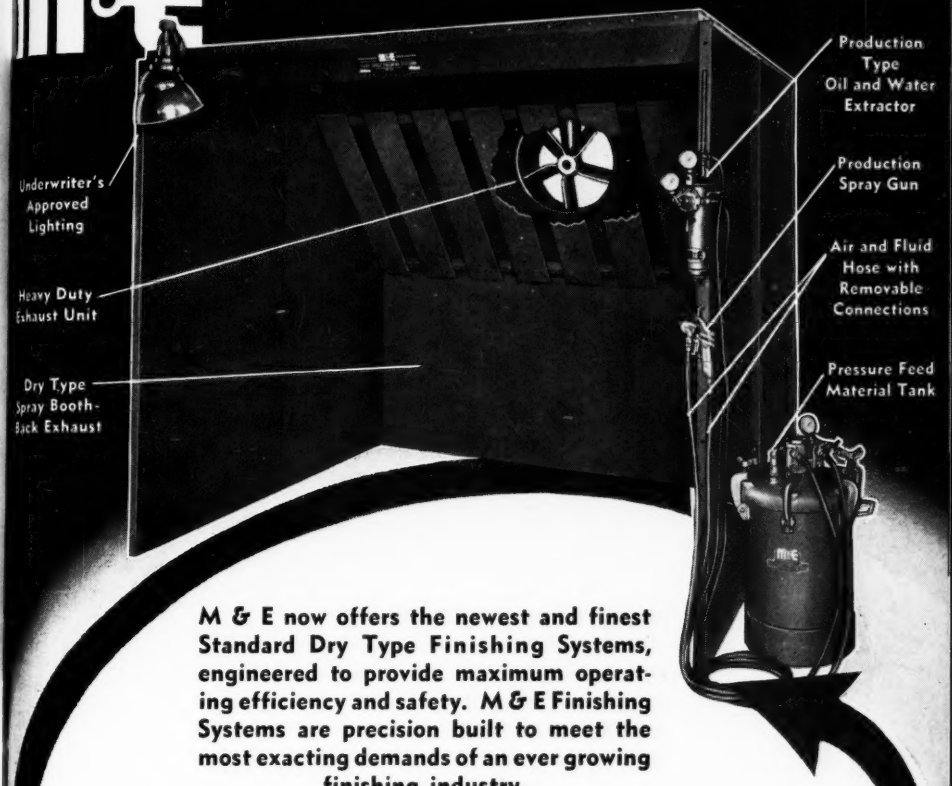
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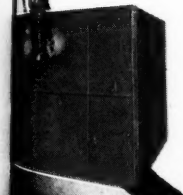

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hesion to most surfaces, good color retention, and excellent weathering characteristics. They have hardness, flexibility, moisture and solvent resistance. They withstand the action of many reagents and show little change in gloss, even after long exposure periods. Many require reduction with only inexpensive thinners."

In view of these properties, it is understandable why so much glycerine goes into their manufacture and why alkyds are the synthetic resins most used by the surface coating industry. Anent this point is Catlow's[11] observation that the alkyd type of resin has for years sold in greater volume than any other type of synthetic resin used in surface coatings.

Because of their widespread use, Johnsen[12] feels that the alkyds have, in a sense, approached the status of being universal resins. This is extended by Robertson's [13] remark that it is now possible to produce finishes of all types for air-drying or baking, spraying or brushing, from alkyd bases. From the quality and application angle, alkyds can now be used for nearly all types of surface coatings. Moreover their quality is equal to, and often superior to, coatings previously employed.

A very important element in the expansion and future potentialities of alkyd resins is the fact that Government specifications for coatings, including those of the Army, Navy, Marine, Maritime Commission, and many other Federal agencies, have been widely based on these resins. In addition, notes Moore,[14] manufacturers have become accustomed to the fast production schedules which can be maintained by using variously modified alkyd resins. They also feel that if this type of finishing meets the exacting requirements of the various Government agencies, it must be good. "The trend in industrial finishes," he states, "is for the best, at a reasonable price, and alkyd resins appear to be the best answer to date."

Although the first alkyd resin, a reaction product of glycerine and phthalic anhydride, was reported by Watson Smith[15] in 1901, it was not until the late 1920's that these synthetics began to take on commercial importance. Their first major field of application, and one which the alkyds still retain, was in conjunction with nitrocellulose lacquers for automobile finishes. Glycerine phthalate resins modified with saturated type fatty acids were combined with nitrocellulose to speed drying time and improve gloss, flow, depth, weather resistance and other characteristics of the finish.[16]

[11] Catlow, W. R. Jr.: Oil and Soap 22:131, 1945
[12] Johnsen, K.: Ind. Finishing 21:56, Feb. 1945

[13] Robertson, G. H.: Paint, Oil and Chem. Rev., Nov. 2, 1944, p. 78
[14] Moore, C. G.: Oil and Soap 23:69, 1946
[15] Smith, W.: J. Soc. Chem. Ind. 20:1075, 1901
[16] Sanderson, J. McE.: Paint Ind. Mag. 55: 385, Nov. 1940

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Improvements in cellulose derivative-glyceryl phthalate alkyd combinations continue to appear.[17]

Following their success in automotive finishes, alkyds began to be used extensively in other finishes for metals.[18] A large volume of alkyd resins was used in the finishing of metal refrigerator cabinets when it was demonstrated that they met the requirements of extreme resistance to discoloration on baking or aging coupled with resistance to water, grease, abrasion, and impact. Having successfully passed the severe requirements of refrigerator finishes, it was not long before alkyds were adopted for baked finish on a wide variety of other cabinets and metalware. Similar baked alkyd enamel finishes were used also on tinware and other sheet metal products to produce the combination of adhesion, distensibility, and toughness required to stand forming operations.

Today, both air-drying and baked alkyd finishes are found on innumerable large and small articles in everyday use—ranging all the way from street cars, through metal signs and toys, to cigarette lighters. In such finishes, the alkyds continuously display their ability to withstand the effects of rain, sun, high humidity, grease and oil, and perspiration. Moreover, they have proved their ability to render protection over longer periods of time than did their predecessors.

Once the trend toward the use of alkyds in metal finishes had set in, improvements continued to appear and find wide utility. One major development resulted from the discovery that the conjunct use of alkyd resins and urea-formaldehyde was mutually beneficial. Thus, while urea-formaldehyde resins had been noted for their light color and color retention, they also possessed such defects as poor water and moisture resistance, poor adhesion, poor stability, and lack of compatibility and uniformity. These disadvantages, it was found, could be overcome by the incorporation of a glycerine-phthalate reaction product.[19] Because of the short baking period necessary to obtain extreme hardness, mar-proofness, and light-fastness, these urea-formaldehyde-alkyd resin combinations are now being extensively used not only for white but also for colored enamels for refrigerators, hospital equipment, metal equipment, and metal kitchen cabinets.[20]

Further investigation showed that the use of special acidic accelerators permitted the formation of air-drying urea-formaldehyde-alkyd combinations.[21] Thus, it became possible not

[17] Zoland, J. J.: U. S. Pat. 2,389,708, 1945
[18] Leffingwell, G. and Lesser, M. A.: Metal Finishing 42: 718, 1944

[19] Hodgins, T. S. and Hovey, A. G.: Ind. and Eng. Chem. 30: 1021, 1938
[20] Hodgins, T. S.; Hovey, A. G. and Ryan, P. J.: Ind. and Eng. Chem. 32: 334, 1940
[21] Hodgins, T. S. and Hovey, A. G.: Ind. and Eng. Chem. 33: 512, 1941

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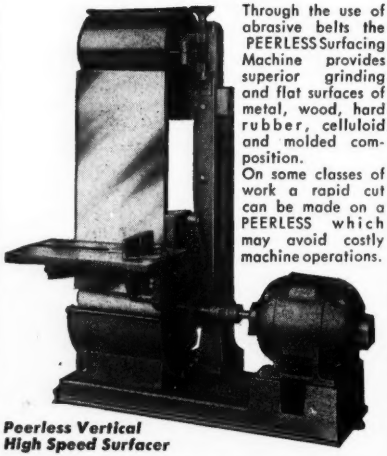

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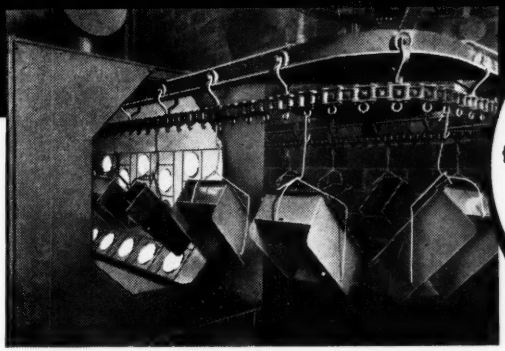

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only to shorten baking schedules and lower baking temperatures, but to effect air-drying as well.

Never a static field, continued work revealed that replacement of the urea-formaldehyde resins by melamine-formaldehyde resins in the alkyd-containing combinations resulted in even greater improvement in hardness, gloss and color retention, and baking schedules.[22] Such combinations of melamine-formaldehyde resins and alkyd resins are now being widely used in baking enamels in white, in pastel tints and in dark colors for finishing stove parts, metal furniture, refrigerators, automobile bodies, metal cabinets, electrical appliances, washing machines and other kinds of metalware. Interesting in this connection is a patented coating to prevent tarnishing of silver and brass.[23] For this purpose a lacquer is prepared with a castor oil-modified glyceryl-phthalate resin and a butylated melamine-formaldehyde resin.

It should be noted, however, that mixtures of alkyd resins, urea resins, and melamine resins have specific applications of their own. Illustrative of the combined use of these three is a patented coating for ferrous metal ice trays;[24] the conjunct use of the resins providing a moisture-repellent, baked enamel-like, flexible, adherent, and abrasion-resistant layer.

Of course, alkyd resins have many other standard and specialized uses in metal finishing. They are used extensively, for example, in primer coats and anti-rust finishes for steel and for making corrosion inhibiting primers for aluminum and its alloys. Alkyds are also used in more specialized products like coatings for electroplated ware,[25] wrinkle finishes,[26, 27] "hammered-effect" finishes[28] and other novel film-forming compositions.

[22] Hodgins, T. S.; Hovey, A. G.; Hewett, S.; Barrett, W. R. and Meeske, C. J.: Ind. and Eng. Chem. 33: 769, 1941

[23] Light, D. W. and Moore, L. P.: U. S. Pat. 2,223,327, 1940

[24] Bunting, A. L. and Schultz, A. G.: U. S. Pat. 2,383,589, 1945

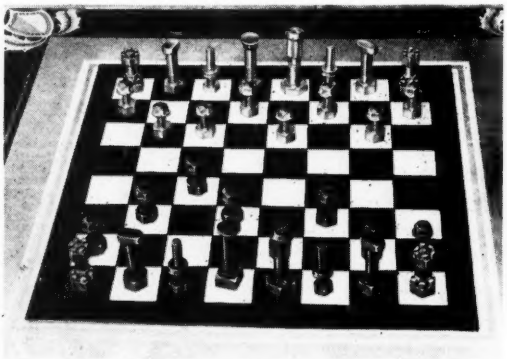
[25] Loeserman, M. M.: Mo. Rev. Am. Electroplaters' Soc. 28: 449, 1941

[26] Luaces, E. L.: U. S. Pats. 2,389,794-5, 1945

[27] Waldie, W. R.: U. S. Pats. 2,392,346, 2,394,498-2,394,500, 1946

[28] Crosby, E. W.: U. S. Pat. 2,326,623, 1943

Belke Drying Barrels and Sawdust Separators are described in a bulletin issued by the Belke Manufacturing Co., 947 N. Cicero Ave., Chicago 51, Ill. In addition to the line of steam heated sawdust barrels and sawdust separators manufactured by the company, the bulletin describes also a combination sawdust barrel and separator designed to provide for increased efficiency and maximum economy. Copy free upon request.



THE accompanying illustration shows a set of chess men composed entirely of steel fasteners made by the Oliver Iron and Steel Corp., Pittsburgh, Pa. One force of the chess men wears electro-galvanized "armor" and the other is finished in a standard black. The Pawn is a washer head bolt with hexagon nut; the Castle, a steering knuckle stop screw with double castellated nut assembly; the Knight, a shock absorber bolt with hexagon nut; the Bishop, a collar bolt with hexagon jam nut; the Queen, a short square plow bolt with square nut; and the King, a wheelbolt with hexagon jam nut.

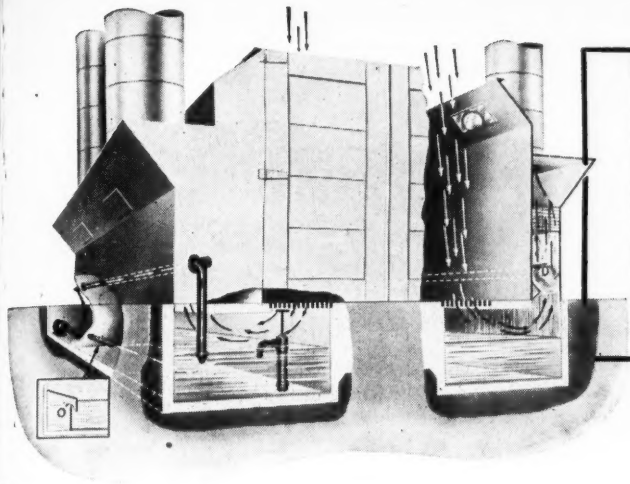


FIG. 3

Diagram of a Binks down-draft Dynaprecipitor unit, showing the flexibility of the Dynaprecipitor principle. In this booth the air is vented through grills in the floor. This layout is ideal for use with heavy products such as automobiles, railway cars, etc.

Exhaust air washed 5 times: The paint and fume-laden air passes through 5 thorough washings before it is vented. See 5 stars (★) on Figure 1. Paint pigment is collected in the Dynaprecipitor. It will not unbalance the fan, or collect in the exhaust ducts or on the exterior of the building.

Dynaprecipitor stays cleaner much longer: All surfaces with which the overspray comes in contact are constantly flushed. Booth cleaning time is minimized.

Unique clog-proof construction: There are no nozzles to clog. The water is distributed directly from the large manifolds by means of deflector plates.

Uniform distribution of large water volume: There are no breaks in the water curtains . . . no gaps in the air-washing spray. There is more water circulated per lineal foot of a Binks Dynaprecipitor than any other booth.

Efficient paint reclamation: This unit washes out and collects an exceptionally high percentage of the overspray for reclamation. Heavy solids and light pigments collect in the fore part of the pan and are prevented by a divider in the pan from recirculation through the system.

Manifolds constantly flushed: The water constantly circulates through the manifolds to prevent settlement of sediment. This is illustrated in Figure 2.

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Barrel Finishing of Metal Products

Part 20—Continuing the Discussion of the Use of Pebble and Fractured Mineral Forms in Barrel Finishing Procedure

By H. LEROY BEAVER
Barrel Finishing Consultant
Lansdale, Pennsylvania

SINCE we embarked on the discussion of the use of pebbles or of manufactured ball forms of porcelain, or other mineral constituents, it was only to be expected that we would get the customary deluge of inquiries as to this and that factor governing the procedure in the use of these materials.

Several of these letters have pointed out, and one very pertinently asks the question, "You have always stressed that no round ball ever reached into and burnished an angle or a groove smaller than its own diameter; now what about round or semi-round pebbles?" We have never said and do not say now that a rounded pebble can reach into and finish an angle on a metal part or a groove where it simply cannot effect contact, for it just cannot under any application of mechanical principles do any such thing, but that does not mean that we are without resourceful remedies to overcome any such objections.

It seems that from time to time we find ourselves yanked back and forth by two factions who read these discussions, one wanting to know why we do not stick to definite technical descriptions and the other insisting on nothing but lay language in discussing factors in the finishing of products, both metallic and otherwise. Suppose we examine then a few definitions of some of the things we are discussing. First then, a ball cannot reach into an angle because it is a sphere and a sphere technically described is: "A solid, every part of whose surface is equidistant from a point within called the center." Of course, the term spherical simply means a part shaped like a sphere or globular.

Now when we come to a pebble we have something very different. Its lay description would likely be: "A rounded fragment of rock, the form being due to attrition as of water, ice or wind blown sand." This could be aptly illustrated by a rough and angular fragment being carried back and forth by the ocean tides until all of its cutting or angular edges were worn away, reducing it to substantially pebble form. Technically though, if you are interested, we would define a pebble as being: "A heteromorphic assymmetrical mineral unit." Now hetero-

morphic simply means deviating from the normal form or standard type and assymmetrical means want of symmetry or proportion, but for our own simple part and speaking for many others we would just content ourselves by defining a pebble as a lopsided, rounded hunk of stone.

There is a way in which we can use pebble barrel finishing and reach into angles and grooves, and it is comparatively simple. If you will study the literature of suppliers of both barrels and materials you will note that they supply minerals in two forms, generally termed "processed" and "unprocessed." We still have no explanation of why this should be, because it is only a question of relatively short operating cycles until what starts as unprocessed material becomes processed and it does this automatically and just as soon as its initial cutting edges are rounded off.

The unprocessed material is fragmentary in form and has sharp cutting edges on all sides. As such the unprocessed particles will reach into angles and grooves and it is not until they reach the "processed" state that their efficiency curve takes a steep downward plunge. This does not mean that the entire load of mineral abrasive materials must be junked and a new load started, but it does mean that with each barrel load of work there must be not only processed materials but unprocessed as well and the two forms acting with each other will provide for an overall finish.

We are speaking now of minerals that would not come within that class that we would term "friable"; that is, minerals that would be sufficiently soft that the stresses set up within the finishing mass would be such as to cause friable minerals to fracture and refracture, presenting a continuity of new cutting edges to act against metallic parts in process. The load, as it is

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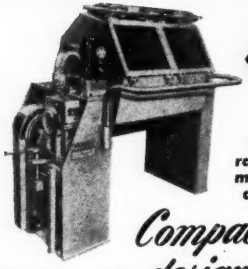
termed, should be a combination of both hard non-friable and soft or friable minerals, the two forming a combination that would have a two-fold effect, the non-friable being the weight-adding factor and the friable having more to do with rapid cutting action due to the presentation of the continuity of new cutting angles.

All minerals that we would use in barrel finishing procedure have their own peculiar crystalline forms, and these forms constitute one of the easiest ways by which they can be recognized and properly classified. All of these crystalline forms have what are geologically termed "lines of cleavage," which is simply to say that wherever two crystals are joined together the jointure line is the line of cleavage. Under stress, these crystalline forms will part along these lines and each time they do, they will present new cutting edges. If the stresses set up within the finishing mass due to the action of the resultant force are great enough, we will not only have refracturing along the normal lines of cleavage, but many of the crystal forms will be shattered across their section and thus present new cutting edges.

As to non-friable minerals, they will be effective as "cutting" agents so long as their edges remain sharp, but as these edges are dulled by contact with the metal parts they lose their cutting efficiency and become "rubbing" contacts which, while they will remove some surface area, at the same time effect a slow-down in the operating cycle. With a combination of the two sorts of minerals as suggested, the non-friable will remain comparatively stable, while the friable will fracture and refracture until literally completely consumed. Thus you see that a combination of non-friable and friable minerals will in the majority of applications prove more highly efficient than a single material.

There is a kind of relation between a file, as that term is generally understood, and a cutting mineral, the file representing by its serrations the cutting edge, just as the edge of a piece of mineral represents its cutting edge. When a file wears down or its serrations are so rounded off that it no longer provides a satisfactory "cut," it is generally discarded and replaced with a new file. We do not, however, discard the harder minerals or artificially produced fused abrasives even though the size of the pieces are reduced, because the same evaluations that we gave you sometime ago concerning the effectiveness of steel burnishing balls has an equal application to minerals used in barrel finishing procedure. Personally, we prefer the more stable materials to be within the smaller size range for the very obvious reason that they effect more points of contact per inch of surface area and thus provide for a more rapid finishing action.

MURCO
TUMBLING BARRELS



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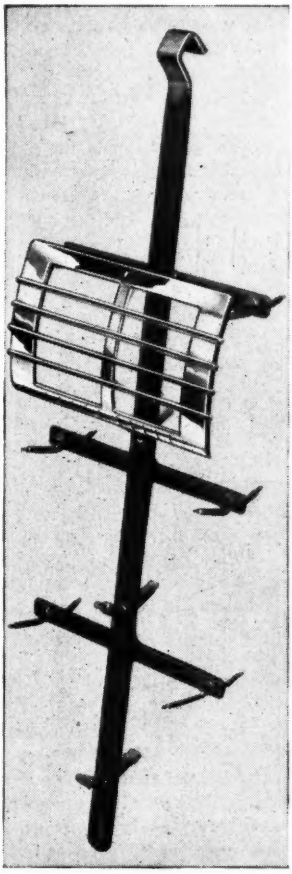

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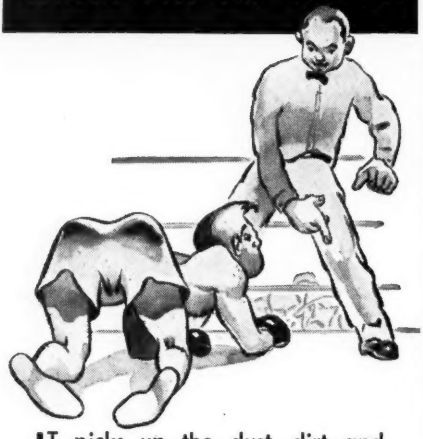

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To those of you who have converted over from steel barrel finishing materials to minerals, don't expect operating cycles to be of the same length of time, because for the most part pebbles and many of the mineral forms are, for equal bulk, only about one-third the weight of steel materials.

Perhaps it would be something of a surprise to many of our readers to learn that ball and pebble mills were a part of regular production procedure in the grinding of various pigments and other materials long before the advent of barrels for the finishing or processing of metal products. These manufacturers of ball and pebble mills never had angles and grooves to contend with and their principal concern was with the securing of adequate materials for use as grinding or crushing media in their barrels. Rough, ball-shaped forgings were used long before polished steel balls and, in many instances, round cast iron balls, the latter, of course, in cases where the casual introduction of the mineral and a metallic substance combined was not too important. In the comparatively recently introduced bottle-shaped barrels with projecting necks we find nothing new because all of twenty-five years ago in a machinery dealer's shop in Philadelphia we saw a rather large bottle shaped barrel, the radius of which was something over twelve inches. In the body of the bottle shape was a 12-inch cast iron ball and, as the barrel revolved, pigments or other materials to be pulverized were added and the action of the heavy ball rolling over the pigments was supposed to produce the required results. Just how satisfactory the process was we never learned because our interest was not in crushing or grinding but in processing smaller parts.

There is one factor in pebble barrel finishing that has us very considerably puzzled, as you might judge from the previous discussion, and that is the se-

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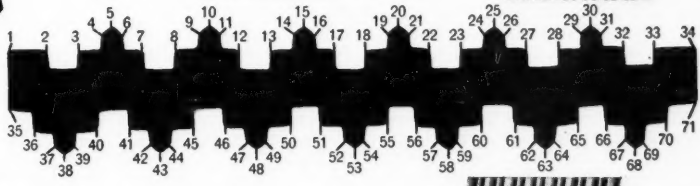

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lection of liners for those barrels. If you will examine the literature of all of the ball and pebble mill manufacturers you will find that ball mills using large or small forged steel balls are for the most part operated unlined, and the shell may be of cast iron or steel. When minerals such as porcelain balls, Danish or French Pebbles are used, it will invariably be found that barrel liners are composed of ceramic or mineral materials. Porcelain as that term is most generally understood when applied to either balls or pebbles or barrel liners of like material simply means that a slip is made with steatite or magnesium silicate as its principal constituent and this is formed into ball-shapes of various sizes and fired in kilns. In the case of barrel liners the forms are cast in molds which are also kiln fired and then fitted into the interiors of the barrels and the joints tightly cemented so that the entire barrel interior might be said to be non-metallic. When porcelain liners are not used, then the liner material will more than likely be of buhrstone or silex. We, of course, vigorously deny that most of the action in a barrel is provided by rubbing contacts with the inner periphery of the barrel as has been advocated by some, but we do admit that many parts in process and especially the lighter ones that are operated in what we term mass production units do make contact not only with the periphery of the barrel but with the sides as well, and ceramic liners in such cases have their own peculiar values.

Then too, there is the matter of size and capacity of barrels. We touched somewhat on this last month in discussing the size of barrel proportioned to the size of part to be operated upon. If you would consult the literature of any of the pebble mill or pebble barrel makers, as well as the makers of ball mills, you would find that the mills to be operated with pebbles are invariably much larger than mills to be operated with forged steel balls. There is a reason for this and very simply expressed it means that in order to have the same pressure factor in a pebble mill as in a ball mill, the pebble mill would of necessity have to be far larger in size. It seems, however, that the newer makers of mills or barrels to be operated with pebbles or minerals have not departed very far from the range of sizes used generally for many years for operation with steel balls, whether they be soft annealed and used with abrasive materials for surface removal or whether they be hardened and polished and used with soap lubricant for the production of lustrous surface finishes. If a given size of barrel holds an even bushel of steel balls, this can be represented as almost an exact 400 pounds. If the same barrel on the contrary is charged with pebbles or fragmented minerals also an exact bushel in bulk, the weight of the

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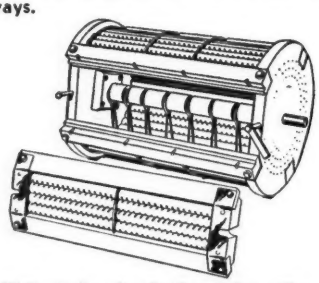
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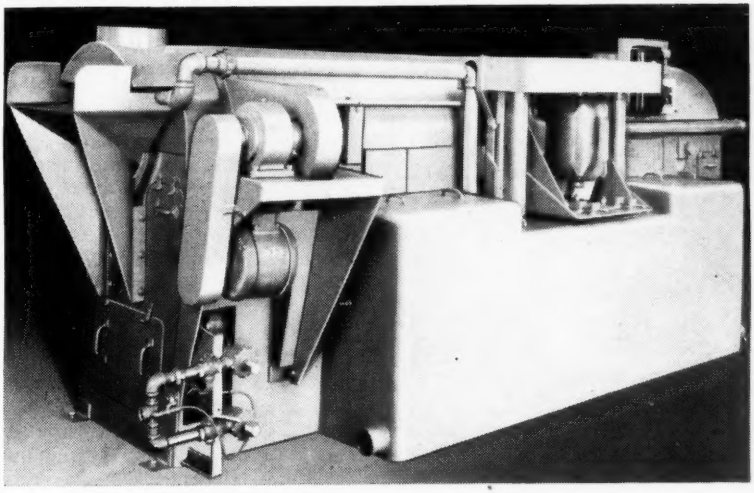

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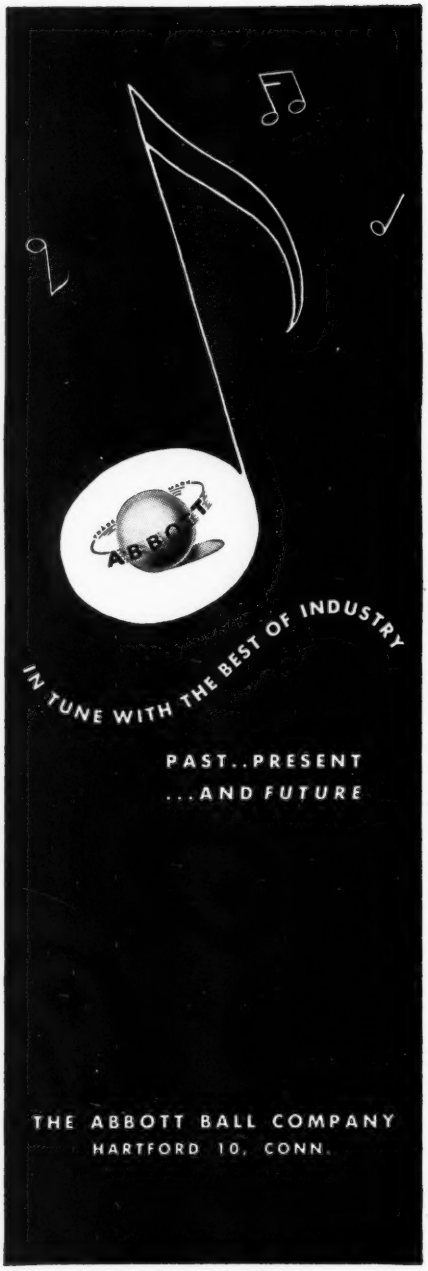

latter bushel will vary from about 85 pounds to approximatey 130 pounds or a mesne weight of approximately 107 pounds. While it is undoubtedly true that a larger sized barrel will carry a higher first cost, it is equally true that with the added weight will also come more rapid finishing action which in a very short time will overcome any difference in first cost.

Examining into the history of the operation and development of barrels not only in this country but in Europe as well, we cannot escape the conclusion that what we are seeing today in the application of pebbles and the various minerals constitutes a revival of what had been done many years ago before the advent of steel barrel finishing materials. From every search we have made we cannot trace the use of steel barrel finishing materials in the United States further back than the year 1901, but they had been used in England at least for a period of five to six years prior to that time. Before the advent of steel barrel finishing materials, parts processed in barrels were either of such a character that they could be termed self-burnishing mediums or in lieu of that they were operated with a variety of mineral substances just about as broad as the field of minerals itself.

If a more careful study is made of the use of these other than metal materials, the barrel finishing industry may profit considerably. It is completely wrong to assume that every barrel finishing operation must contain somewhere in itself the ability to produce a completely satisfactory "over the counter" finish to an overwhelmingly large line of parts of every conceivable metal.

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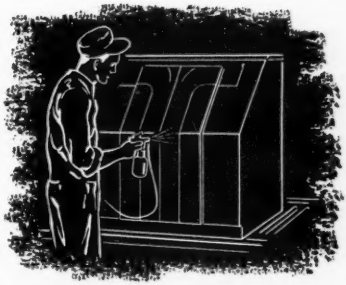

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20 minutes at 300° F. ... 7 minutes with infrared. (Optional schedules are available.)

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never seen a barrel coloring operation performed with minerals that could in any sense equal that produced with polished steel burnishing materials and an adequate soapy lubricant, it is not too hard to visualize pebble barrel finishing as an intermediate operation that would replace the "cutting" operation, leaving the final or buffing operation to produce the desired finish through conventional barrel finishing procedure.

Rust-Oleum Chemical Resistant Coatings. The Rust-Oleum Corp., Box 110, 2425 Oakton St., Evanston, Ill., has issued a descriptive bulletin on chemical resistant coatings designed specifically for service under severe acid or alkali fumes, condensates, moisture vapors, alcohol fumes, greases, and oils. The center spread of the bulletin describes in detail how the chemical resistant coatings provide effective, economical, and lasting protection against rust. Complete, easy-to-understand data are presented on coverage, thinning, accumulated condensation, heat resistance, and interiors of metal storage tanks.

Actual instances of the coatings in use are shown in photographs of plants whose equipment includes tanks and pipes for the storage and use of chemical products, such as in galvanizing, plating and process chemical plants, and so on. Listed on the back page of the bulletin is a convenient 9-point check list that outlines directions for applications of the chemical resistant coatings on both rusted and clean metal. Copy free upon request.

"3M Adhesives in Industry" is the title of a 28-page brochure on the proper selection of adhesives, sealers, and coatings which is now being offered by the Minnesota Mining and Manufacturing Co., 901 Fauquier Ave., St. Paul 6, Minn. The brochure, which contains 40 illustrations, cites 18 case histories and lists 26 of the more than 1,000 formulas offered by the company's adhesives and coatings division in Detroit. The case histories cover such industries as automotive, aviation, shipbuilding, oil, and refrigeration. Copy free upon request.

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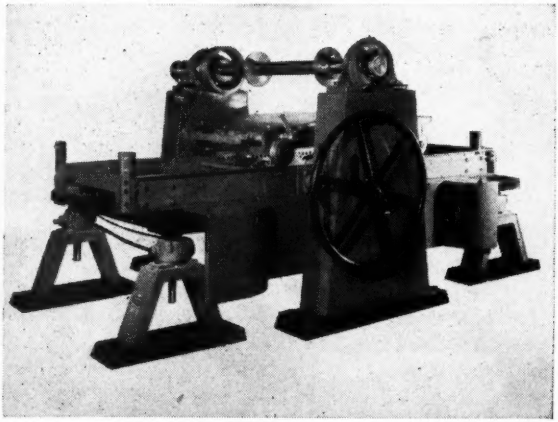

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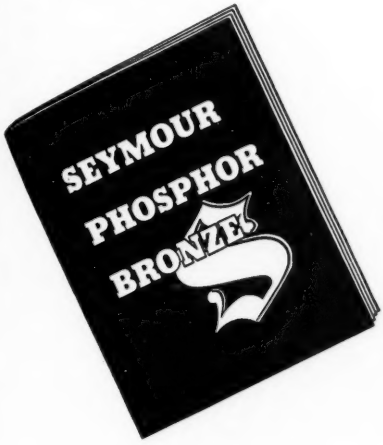

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THE value of phenolic resin coatings for the protection of metallic surfaces against corrosion has long been known. These baking finishes are thermosetting phenolic resin solutions, which, upon application and baking, form insoluble, infusible, dense, glass-like organic coatings. These coatings, which were utilized some 30 years ago for the protection of brass beds against tarnish, are finding extensive use in the metal-finishing field for prevention of corrosion. The properties of the baked phenolic finishes which are reported to be contributing to their expanding use in the metal-finishing field are excellent resistance to mineral acids, organic acids, organic solvents, and most inorganic compounds, along with good electrical insulating properties, good abrasion resistance, and thermal resistance up to about 400 deg. Fahrenheit.

Based on work carried out in the Laboratories of the Bakelite Corporation, New York, the curing of phenolic resin baking coatings on metal by induction heating offers many interesting possibilities. This method has been applied to the continuous coating and curing of thermosetting phenolic resins on pipe, and offers considerable promise. The process involves the continuous passing of the pipe through a tank of the coating solution, and then through an electromagnetic field actuated by low frequency alternating current. The pipe is almost instantly brought to the desired temperature, and the coating is cured within several minutes, depending on the reactivity and

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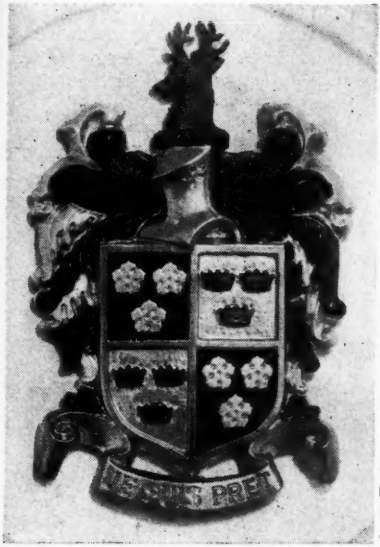

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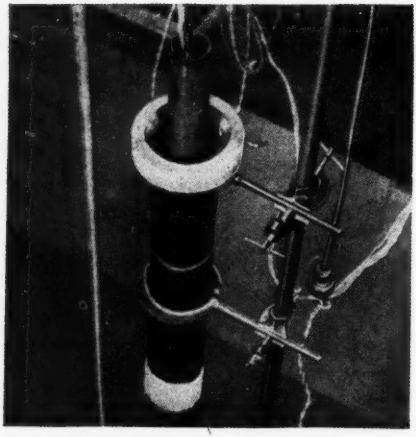


Fig. 1—Steel pipe being coated in laboratory resin bath
(Illustration courtesy Bakelite Corporation)

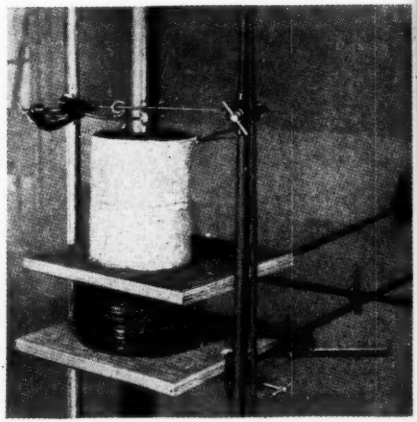
heat resistance of the coating and the power applied.

The recommended baking times for conventional baking methods with phenolic resin coatings are reported to range from 20 to 60 minutes at 275 to 400 deg. F. The common sources of heat which are being used commercially are in general (1) electrically heated circulating air ovens, (2) gas-fired circulating air ovens, (3) infra-red baking units, and (4) a combination of the regular gas-fired convection type oven and infra-red baking unit.

It is noted that all the above sources of heat depend upon convection or radiation to transfer heat to the mass being baked. In all cases heat is forced from the outside, through the resin film to the surface of the coated piece. Thus, the outer film is cured first and that next to the pipe last. As a result, the time required to bring the object up to the polymerization temperature represents a large part of the total baking cycle, whereas in induction heating methods the article to be coated is almost instantly brought to the required curing temperature.

The method for continuously coating steel pipe, as worked out in the Bakelite Corporation Laboratories, is as follows: The sandblasted pipe is introduced into the resin bath and coated inside and out, as illustrated in Fig. 1, and is then mechanically withdrawn passing through the induction heating coils, as shown in Fig. 2. These coils supply the electromagnetic field actuated by low-frequency alternating current. Figure 3 shows coated pipe sections leaving the laboratory size heating coils. It is reported that the pipe is brought from room temperature to 400 deg. F. in 2 minutes by the lower coil, held at this temperature for three minutes by the upper coil, and then hoisted out and allowed to cool. The pipe while being heated is passed through the coil, but is never in direct contact with it. By increasing the amount of power supplied, the speed of baking is increased (see also the Proceedings of the 1945 Fall Regional Meetings of the Federation of Paint and Varnish Production Clubs). A diagram of the laboratory continuous induction pipe coating equipment used by the Bakelite Corporation is shown in Fig. 4.

Fig. 2—Steel pipe passing through induction heating coils
(Illustration courtesy Bakelite Corporation)



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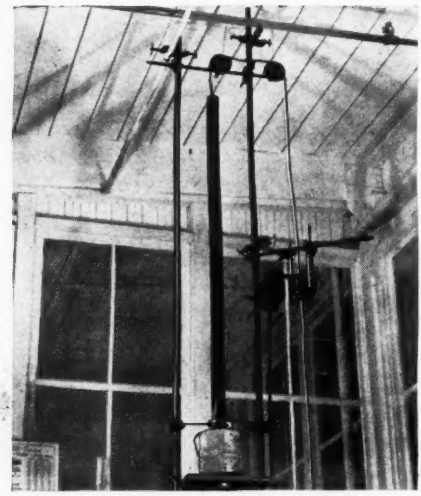


Fig. 3—Laboratory setup showing coated pipe sections leaving induction heating coils (*Illustration courtesy Bakelite Corporation*)

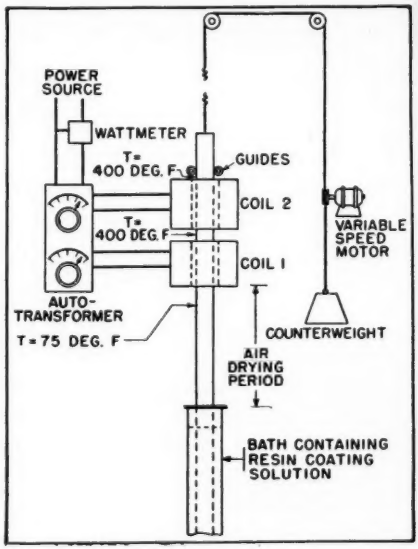
A comparison of the time required to bake the coated pipe in a ventilated oven versus the induction heating method using a low frequency alternating current at a power input of only 400 watts is given in Fig. 5. Even with this low power input, it will be noticed that the oven required nearly 30 minutes to reach the 350 deg. F. temperature, which is obtained electrically in 5 minutes.

The extensive studies carried out by the National Bureau of Standards on steel pipe coated with lacquer, enamel, galvanizing, and wrapped coatings and buried in various types of corrosive soils for 4 to 6 years showed that phenolic resin baking coatings were practically unaffected, even to retaining high gloss after cleaning (see also National Bureau of Standards Research Paper R. P. 1446). In another test that has been reported, boiler tubes coated with phenolic resin baking coatings were subjected to boiling water at 212 deg. F. on the outside and heat radiation at 675 deg. F. in the inside.

In many applications of resin baking finishes, especially where the corrosion problem is severe, the use of multiple coats has many advantages over a single-coat system. However, the application of multiple-coat systems involves the problem of not overbaking the undercoat in order to provide good fusion between the coats, especially if four or five baking schedules are required. Thus, it appears that the excellent temperature control possible with induction heating methods would appear to be an advantage in baking operations involving multiple coating systems. Consequently, there is the possibility of obtaining any degree of cure for a given coat by either regulation of the power input or the rate of travel of the work.

Therefore, the work reported on induction baking of resin films on pipe indicates that this method is practical

Fig. 4—Diagram of unit for continuous induction baking of resin coated pipe (*Illustration courtesy Bakelite Corporation*)



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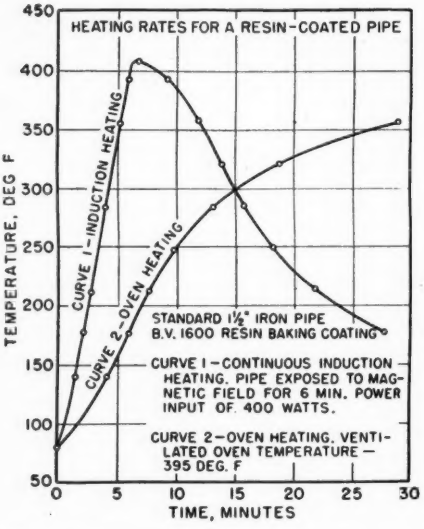
and will provide results equivalent to other methods of baking. There is the possibility that in the future this heating method may be applied to various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TEMPERATURE, DEG F
TIME, MINUTES
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CURVE 2 - OVEN HEATING
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Fig. 5 — Diagram showing relative rates of heating of resin-coated pipe by induction and oven heating methods
(*Illustration courtesy Bakelite Corporation*)

types of metal items having baked resin coatings.

* * *

Electropolishing of Silver

ONE point of interest to metal finishers attending the 92nd meeting of The Electrochemical Society in Boston was a demonstration at the research laboratories of Arthur D. Little, Inc., Cambridge, Mass., of a process for electropolishing silver. The new process was developed at the research laboratories of Arthur D. Little, Inc., under the sponsorship of Oneida, Ltd., Oneida, N. Y., maker of flat and hollow silverware, and is reported to greatly simplify the finishing of silver. The process, which involves passing a current in a direction opposite to that employed for normal plating, is carried out in a final bath, immediately after plating, the silverware remaining on the plating racks. It was reported that a complete polish, up to mirror brightness, can be produced, and that the process usually eliminates the primary buff entirely.

Typical operation of the new process, as demonstrated before The Electrochemical Society members, involved the handling of spoons, knives, and forks which were given an electroplated coating of silver from the usual cyanide bath. These articles remained mounted on their regular plating racks during the electropolishing operation, which involved simply lifting them directly from the plating bath into the polishing bath without an intermediate rinse. It was pointed out that the polishing solution can be made a part of a regular automatic plating line.

It was reported that the solution used is covered by patents based on the Arthur D. Little work. A typical composition that has been described consists of 4 to 6 oz. Troy metallic silver per gallon, added as $KAg(CN)_2$, 4 to 5 oz./gal. of potassium cyanide, and 6 to 8 oz./gal. of potassium carbonate. A potential of about 2.5 to 3.5 volts, d.c., depending on the area of the work and other operating conditions, is applied to the bath, making the article to be polished anodic and using silver or other metal as a cathode. The ratio of electrode areas is not critical, but the ratio of 1:2 anode to cathode area was selected as convenient. At the above voltage a current density of 10 to 20 amp./sq. ft. is maintained for electropolishing.

It was stated that controls for the bath are simple and involve only the periodic analysis for silver, free cyanide, and potassium carbonate, differing in no essential part from the normal routine control for a silver plating bath. Anode and cathode effi-

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ciencies were stated to be high, with the result that the bath composition changes very little with use.

* * *

Proper Rinsing Following Alkali Cleaning Operations Is Important

ONE important point brought out as a part of comprehensive discussion of metal cleaning methods appearing in a recent issue of "American Machinist" (Nov. 6, 1947) is the significance of thoroughness of rinsing operations following alkali cleaning procedure in the finishing line. Thus there is little doubt that good rinsing of work, whether carried out by spray or dip methods, is the answer to many cleaning set-up problems. Rinsing procedures cannot be regarded casually if alkali cleaning is to be successful and if subsequent solutions are to remain uncontaminated. The usual experience is that when something goes wrong in the cleaning set up, it almost invariably happens that the cleaning solutions are first blamed, rather than the rinsing, where oftentimes the trouble has developed. Thoroughness of rinse, therefore, determines the efficiencies of succeeding solutions. Granted that perfect rinsing is impossible because water soluble material cannot all be removed by dilution, rinsing operations can still be made thorough and complete enough for all practical purposes.

It should be realized that work coming from the alkali cleaner is coated with a film of cleaner that may also contain emulsified oil or grease removed from the work. Recesses and holes in work also encourage carryover by entrapping cleaner solution, even in cases where fair rinsing practice exists. Introduction of this alkali film into an acid pickle dip partially neutralizes and weakens the acid solution and lowers its activity by raising the inactive salt content. Furthermore,

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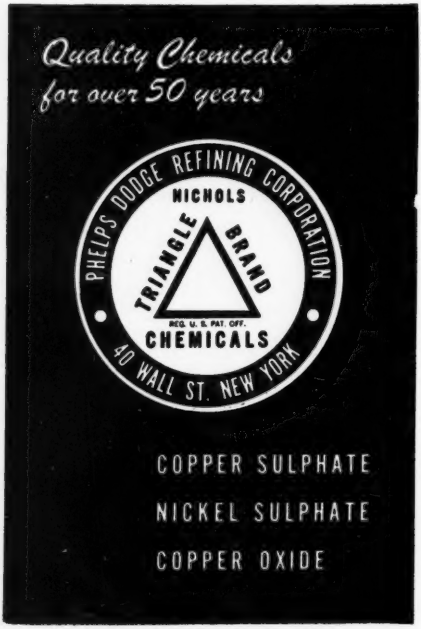
the oil residues carried over from the cleaner may build up in the acid dip tank, resulting in a "water-break" surface on the work. The cleaner carried over into the acid dip tank may contain soap, which could be broken down into the fatty acids or greases from which it was originally formed. Good rinsing between cleaner and acid dip will remove these emulsified oils and soaps that otherwise would contaminate the acid solution.

Commonly used in rinsing operations is the overflowing dip tank wherein the water must overflow constantly in order to remove contamination from previously used solutions. In dip tank rinsing operations particular attention should be paid to drainage of the cleaner from the work in order to avoid excess contamination of the rinse. It can be seen that immediate transfer of work from cleaning solution to rinse tank would build up contamination quickly. One estimate is that immediate transfer causes a carry-over three times that found with a drainage period of five seconds. However, it is best that transfer from cleaner tank to rinse be rapid enough to prevent work from drying.



Agitation of rinse water is a decided help in speeding up rinsing and in providing a better rinse. There are several ways in which agitation may be provided; namely, by blowing in compressed air, attaching a pump to keep the water circulating, and moving the work while it is immersed in the tank. However, in all cases agitation should be directed to carry water and contaminants toward the tank overflow.

In a spray rinse, clean water is sprayed rapidly over the work to provide a fast rinsing action. By having sprays operate (by automatic or manually-operated controls) only when necessary, water consumption generally can be kept to a minimum. Spray nozzles should be arranged to throw an even spray over the entire surface of the work and directed to rinse thoroughly any recesses or holes. Work replacement is important to effect such thorough rinsing and permit adequate drainage following the rinse. Even though the rinse tank has nozzles encircling the tank and directed at a slight angle for best spraying efficiency, each irregular or recessed workpiece should be studied with the viewpoint of determining its best rinsing position. One particularly effective rinse, it was pointed out, combines the advantages of both the dip and spray systems. By such a system, a rinse tank may be arranged for the regular dip rinse, but as the work rises it is met with a pressure rinse of clean water that removes any contaminants from the dip rinse.

The temperature of the rinse water may depend on a number of factors. In dip rinsing, hot water is usually preferred to cold. Oftentimes a double-rinse operation is preferred, the first

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rinse being hot and the second cold. The final rinse before plating should be cold because the work should be wet going into the plating solution to avoid oxide formation during the transfer. However, when work is to be painted or enameled, generally a hot-water rinse in the final operation is preferred so that parts will dry from their own heat. The finishing engineer will find that proper attention paid to rinsing operations will often result in better overall finishing room efficiency.

* * *

Synthetic Rubber Derivatives As Corrosion Resistant Coatings

ACCORDING to J. B. Martin, Hercules Powder Company, in a presentation before the Modern Metal Protection Symposium held in Cleveland, chlorinated rubber is particularly adapted for the manufacture of industrial maintenance paints and quick drying enamels, which, when properly formulated, are finding increasing use under many different kinds of corrosive conditions. Some applications of chlorinated rubber base paints cited by Martin are their use on ice cream trucks to resist salt corrosion; on undercarriages of cars and on license plates to combat road salt; on washing machines, commercial laundries, and bottling machines to resist soap alkali; on structural steel and equipment in acid plants and oil refineries to resist acid fumes; in bakeries and breweries to resist fungus and mold growth; and in many other varied applications.

An outstanding property of a chlorinated rubber film is near-immunity to almost all agents which commonly destroy paint films by chemical action. These include such powerful chemical destroyers as strong acids, alkalis, bleaches, and gasoline. Also important in many cases is the resistant surface chlorinated rubber provides the formulator as protection against simple dampness and vapors and fumes of various kinds. Films of chlorinated rubber possess a high degree of water impermeability and a very low degree of water absorption.

It was pointed out, however, that chlorinated rubber formulated coatings, in common with other coating materials, have limitations. Surfaces exposed continuously to high temperatures must be avoided. Chlorinated rubber base paints are not considered suitable for continuous exposure to liquids above 140 deg. F., or to dry heat above 160 deg. F., due to the thermoplastic character of the chlorinated rubber. As the field of chlorinated rubber based paints for protection against corrosion becomes better explored, it is predicted that an increasing number of paint manufacturers and users will be educated to the advantages of these materials.

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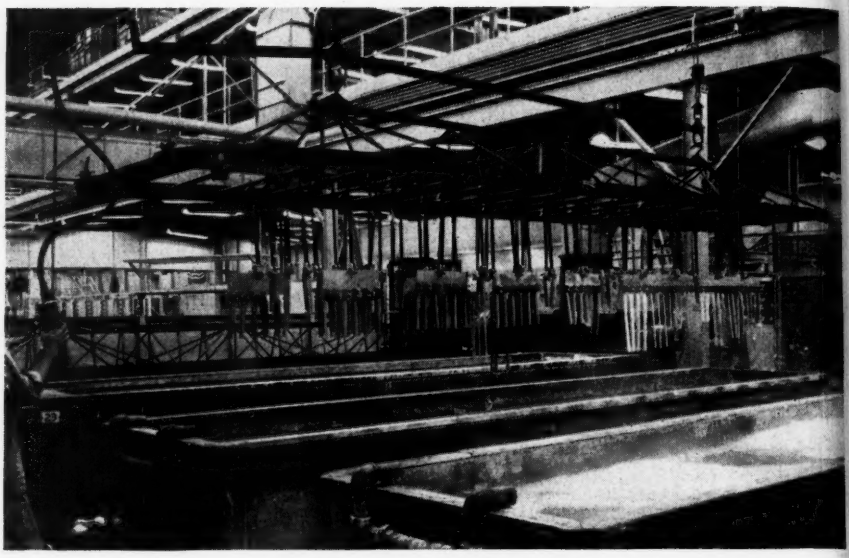

Fig. 6—Commercial setup for producing anodic coatings on magnesium alloys (*Photo courtesy Hanson-Van Winkle-Munning Company*)

Anodic Coatings on Magnesium

IN considering finishes for magnesium products it should be kept in mind that magnesium alloys can be given an anodic treatment by a process which produces a protective coating that can be dyed. This process, known as the Manodyz process, consists of an electrolytic method for forming a protective magnesium oxide-silicate film on the surface of the magnesium alloy. The Manodyz process was originally developed and put into production by the Consolidated Vultee Aircraft Corporation and is now being handled under license by the Hanson-Van Winkle-Munning Company (see also Proc. Am. Electroplaters' Soc. 1946 and "Modern Metals," Feb. 1947).

The anodizing process for magnesium alloys is reported to be economical and easy to operate. After the magnesium parts are thoroughly cleaned they are subjected to either a low voltage alternating or direct current in a film-forming electrolyte containing caustic soda with organic and inorganic additives. Shown in Fig. 6 is a commercial setup for producing the anodic coating on magnesium alloys. It is reported that the same bath formula is used with either a low voltage alternating or direct current but the properties of the derived coatings show some variations. After application the protective coatings are then processed for proper paint adhesion or colored with organic dye solutions. The steps involved in the anodizing process for magnesium alloys, as recommended by the Hanson-Van Winkle-Munning Company, are given below:

Step I—Alkaline Cleaner. 8-20 oz./gal. of a commercial alkaline cleaner designed for cleaning magnesium or steel or a 20 per cent caustic soda solution may be used; temperatures of 180 deg. F. or higher will usually provide best results.

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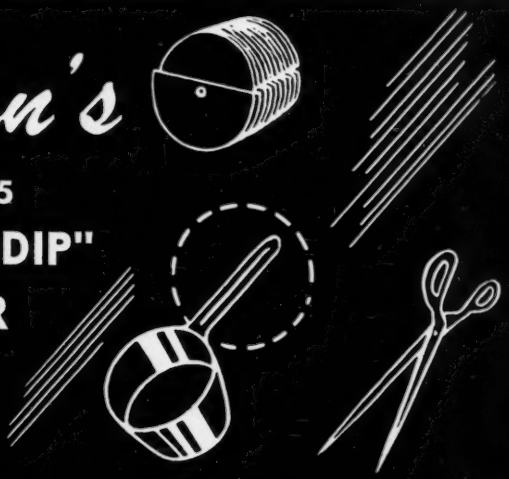

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Step II—Water Rinse. An overflow rinse maintained at 160-180 deg. F.; for best results pH should never be allowed to rise above pH 10 by carry-over.

Step III—Water Rinse.

Step IV—Acid Cleaner. Solution consists of 200 g./l. of chromic acid and 20 g./l. of calcium nitrate. A bath temperature of 120-160 deg. F. is used with an immersion time of ½-3 minutes.

Step V—Water Rinse. (Same tank used as in Step III.)

Step VI—Anodizing Solution. The following materials are required for the Manodyz process:

Caustic Soda—

24 ± 1% by wt. (250 lb./100 gal.)

Sodium Silicate (41°Be')—

3 ± 0.5% by wt. (2.8 gal./100 gal.)

Phenol (crystalline)—

0.3 ± 0.5% by wt. (3 lb./100 gal.)

Step VII—Water Rinse. (Same tank used as in Step II.)

HOLLAND SAYS:
AT LAST
YOU CAN SETTLE
POLISHING PROBLEMS
PERMANENTLY
Heavy Duty Ball Bearing Polishing Machine. V Belt Drive—from 5 to 10 H.P. Motors can be either inside or outside of base.
Write for FREE folder "M" showing our wide selection of metal finishing equipment.
J. HOLLAND & SONS, INC.
MANUFACTURERS • DEALERS
276 SOUTH NINTH ST. • BROOKLYN, N. Y.

Step VIII—Water Rinse. (Same tank used as in Step III.)

Step IX—Neutralizer. The solution used consists of chromic acid, maintained at pH 2.5, prepared by using approximately ½ lb./100 gal. of commercial chromic acid. A temperature of 180-200 deg. F. is preferred with a treatment time of 2-5 minutes. It is best that the organic sealer coat be applied as soon as possible after parts have been dried. If parts are to be given a transparent organic sealer finish, care should be taken to rinse them free of any noticeable excess of chromic acid. For parts that are to be dyed this step may be omitted.

Organic Sealer

Interior Application. When it is desired to retain the natural color or dyed color of the magnesium article, the use of transparent sealers such as lacquers, varnishes, drying oils or waxes are suggested.

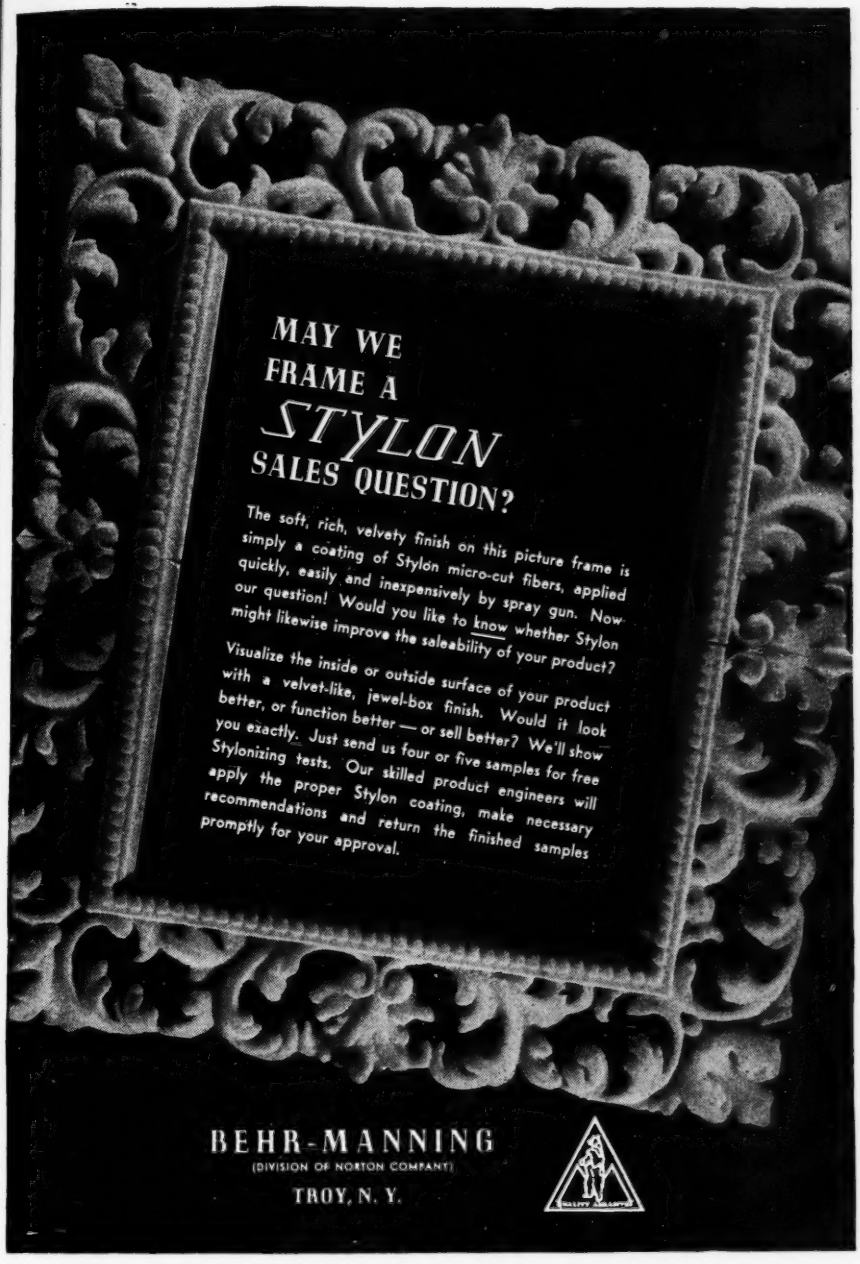
Exterior Applications. When maximum protection of the magnesium part is desired, it is suggested that one dip coat plus one spray coat of zinc chromate primer and one coat of aluminized lacquer to a total depth of one mil be applied.

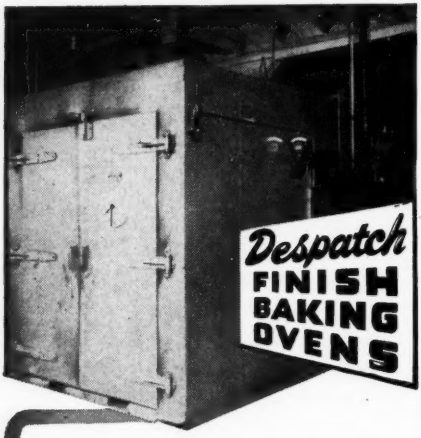
Dye Coloring

The final neutralizer bath may be omitted in preparing magnesium parts for dye coloring. An initial light buffing with a soft flannel buffing wheel may assist in producing a smoothly-dyed surface finish. The dyeing operation consists of the following two steps:

Step I—Mordant Solution. The anodized magnesium article following rinsing is treated for one minute in an aqueous mordant solution containing 0.3 per cent ammonium acetate and 0.5 per cent aluminum acetate. A temperature of 180 deg. F. is suggested as most satisfactory.

Step II—Dyeing. Following the above treatment, the article is trans-


MAY WE
FRAME A
STYLON
SALES QUESTION?
The soft, rich, velvety finish on this picture frame is simply a coating of Stylon micro-cut fibers, applied quickly, easily and inexpensively by spray gun. Now our question! Would you like to know whether Stylon might likewise improve the saleability of your product?
Visualize the inside or outside surface of your product with a velvet-like, jewel-box finish. Would it look better, or function better — or sell better? We'll show you exactly. Just send us four or five samples for free Stylonizing tests. Our skilled product engineers will apply the proper Stylon coating, make necessary recommendations and return the finished samples promptly for your approval.
BEHR-MANNING
(DIVISION OF NORTON COMPANY)
TROY, N. Y.



Cut Costs, Increase Output with this Fast-Baking Oven

Despatch "RS" Finish Baking Ovens are very successful for repair shops and plants with small batches of products. Up to 50% faster baking . . . high volume air flow . . . approved safety system . . . gas or electric . . . moderate investment and low operating cost. Comes ready for operation—no engineer required to set it up.

Applications: For baking thermoset finishes on coils and stators; phenolic coatings on grills and unit assemblies; finish work on japans or lacquers; drying latex, ink, glues, asphalt; light core baking, dehydrating; preheating plastics, aging, and drying, etc. Fast curing or drying of synthetic films, dulux, lacquer, enamels.

Write for bulletin on RS-4 and RS-5 Ovens.

DESPATCH OVEN CO.
Established in 1902
327 DESPATCH BLDG. MINNEAPOLIS 14, MINN.

ferred directly to an aqueous solution containing 0.1 to 0.5 per cent of a selected organic dye or chrome dye and 0.1 per cent ammonium acetate, operated at a temperature of 160-180 deg. F., when dyeing to full depth of color. For pastel shades, dyeing is best carried out at room temperature. In most cases dyes suitable for coloring aluminum can be effectively used in coloring the Manodyzed films.

It is suggested that when magnesium articles are to be both Manodyzed and dyed, considerably more care must be given in cleaning the metal before the anodizing treatment. It has also been noted that additional luster may be obtained by rubbing the dyed part with a soft cloth or coloring with a soft flannel buffing wheel before sealing with wax or clear lacquer. The sealing treatment should be carried out as soon as possible after removal of the magnesium article from the dye bath.

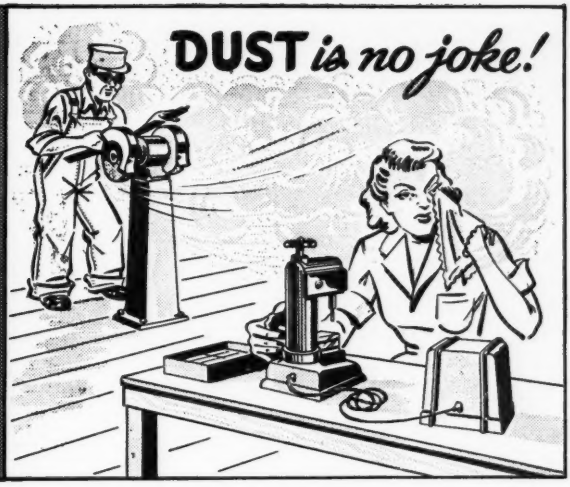
Best's Safety Directory for 1948. Second annual edition. Published by Alfred M. Best Co., 75 Fulton St., New York 7, N. Y. 494 pages. Illustrated. Cloth binding, board covers. Price, $5.00.

This directory covers the entire field of safety, fire protection and control, hygiene, first-aid, and sanitation, and is said to be of particular interest to company safety directors, safety engineers, and production men, as well as financial and corporation executives, insurance agents, safety inspectors, purchasing agents, industrial hygienists, medical personnel, public health and safety officials, chambers of commerce, schools, and colleges.

According to the publisher, the book shows a 50 per cent increase over the previous edition in actual content. In addition, almost complete editorial changes and rearrangements have been made. An outstanding feature of the book is its indexing and subject - grouping system which, together with numerous illustrations, facilitate the location of safety products even when the user is not certain of the type or name of the product he requires. The arrangement of subjects serves as a check list of hazards.

The directory also includes the standards established for safety equipment by the leading standards groups.

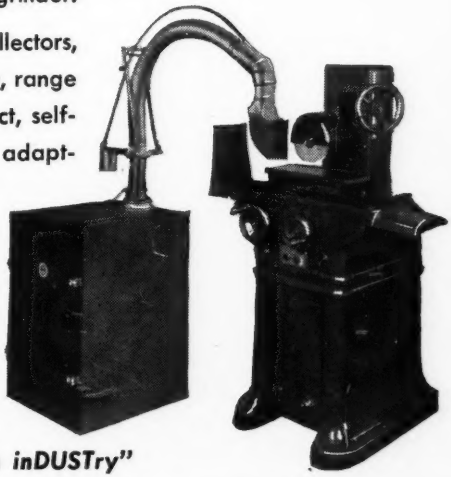
TORIT DUST COLLECTORS



Trap abrasive dust at its source, protect valuable machinery, precision workmanship

In every branch of industry, on all types of equipment, wherever dust is a problem, some 15,000 Torit Dust Collectors are trapping dust at its source and recirculating the cleaned air. Typical of these installations is the one shown below, where a Torit Dust Collector is attached to a surface grinder.

Stock models of Torit Dust Collectors, available for immediate delivery, range in size from ⅓ to 5 HP. Compact, self-contained and portable, they are adaptable to all production layouts and all types of machines. For details and latest Torit catalog write:



TORIT MFG. CO.

314 Walnut St. • St. Paul 2, Minn.

"TORIT takes the DUST from inDUSTry"

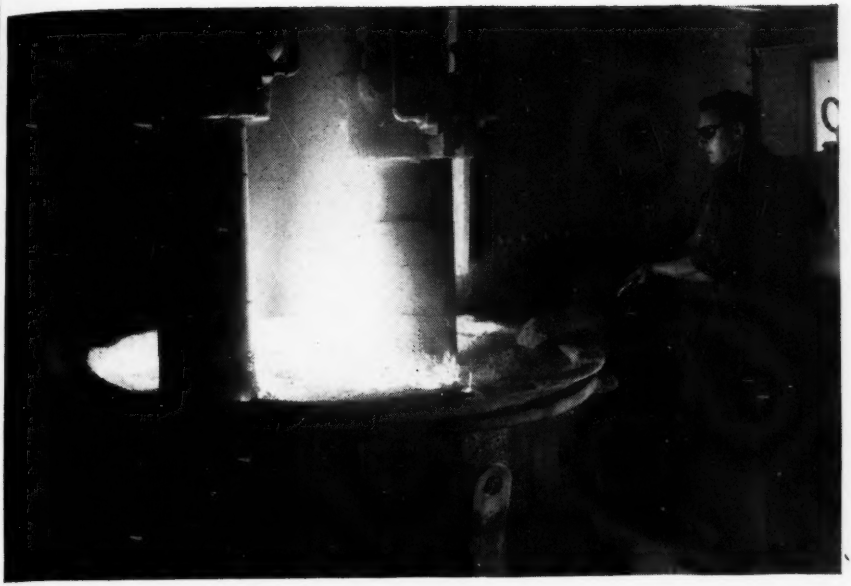
PRACTICAL APPLICATIONS *of Modern Products*

Conveyorized Infra-Red Equipment Improves Production and Quality at Allen

BOOKKEEPING machines, adding machines, calculators, and cash registers manufactured by R. C. Allen Business Machines, Inc., Grand Rapids, Michigan, receive a baked-on high gloss black enamel finish and, in addition, a special satin finish applied to certain areas of the machine cases, which must also be baked. The double-application and double-bake required to secure this type of finish created both a production problem and a quality problem. To solve the production problem, a large amount of floor space had to be devoted to batch-type ovens, and even then there was no smooth process flow so that uninterrupted assembly line operation was possible. The ever-present quality problem was to secure an "even" pattern, and a good, durable bake on the satin finish in view of the normal difficulties attending the baking of such finishes satisfactorily.

To solve both the production and quality problems existing in the R. C. Allen plant, Jensen Specialties, Inc., Detroit, designed, built, and installed a completely-conveyorized infra-red finishing system. This conveyorized finishing system ensures a constant flow of finished business machine cases through the finishing department to the assembly line. Cases are sprayed and baked (both the black enamel and

Business machine parts going through spray booth at R. C. Allen Business Machines, Inc., from which they are conveyed to and through the infra-red oven



Where EXOLON *Quality* Begins

EXOLON — aluminum oxide abrasive grain — is produced by melting bauxite at extremely high temperatures in an arc-type electric furnace (as illustrated above).

Through careful control of this and other processing methods, the Exolon Company produces aluminum oxide abrasives designed for the finest metal-finishing work. "Exolon RST" is one of them — an accurately graded, ceramically coated grain with a slightly roughened surface, for best results with hot glue set-up polishing wheels.

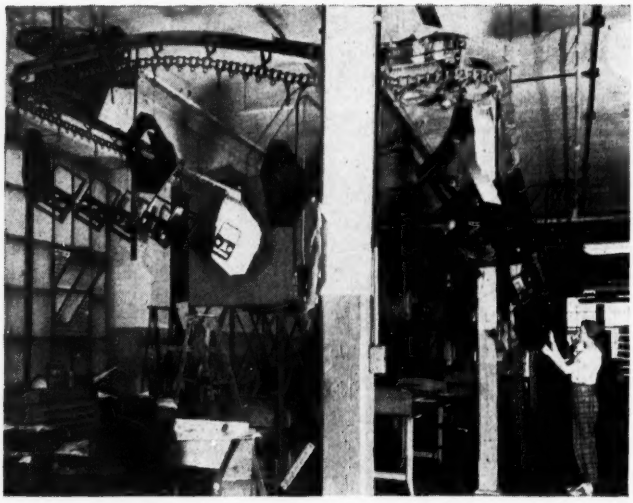
Write for Exolon's folder on polishing procedures for different types of material.

Photomicrograph of Exolon RST Polishing Grains

THE EXOLON COMPANY

943 E. Niagara St. Tonawanda, N. Y.

Manufacturers of SILICON CARBIDE and ALUMINUM OXIDE ABRASIVES



Only a short length of conveyor chain is required for cooling business machine cases after they emerge from the infra-red oven and before they reach the transfer point. The infra-red oven provides quantity production but utilizes only a small amount of floor space.

satin finish coats) on the moving conveyor which passes through both the spray booth and the infra-red oven in continuous cycles.

The solution of the quality problem, a matter of paramount importance, was accomplished by designing the infra-red oven with "nested" lamps and employing the Jensen "dual-heat" combination of both convection and radiant heat. Due to the fact that the lamps are "staggered" or "nested," all parts of the Allen cases are evenly exposed to the infra-red rays. The danger of overbaking certain areas and underbaking others, with the resulting possibility of discoloration, was thus overcome.

Roy J. Charters, Allen plant superintendent, reports that since the infra-red oven has been installed, considerable floor space has been saved and made available for other uses. Further, finishing production has been increased to such a degree that it has been possible to finish several items previously painted in a job shop because of insufficient production facilities at Allen. In addition to the chief advantage of providing an uninterrupted flow of finished cases to the assembly line, the conveyorized infra-red system provides great flexibility of operation in the finishing department, making it possible to alter schedules to comply with assembly requirements.

GOLD PLATING SOLUTIONS
In All Colors
Guaranteed 100% Pure Gold Content
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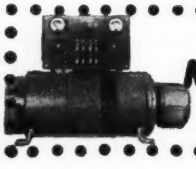
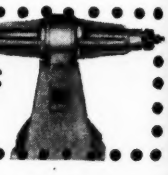

Write for complete **Catalog** of
MGC Plating and Finishing Equipment
Guarantees better plating results...tell us your needs!
MOTOR GENERATOR CORPORATION, BOX PF-48, TROY, OHIO


steel
zinc
aluminum

Developed especially for manufacturers with mixed metal production, the Bonderizing process produces a paint-holding, protective Bonderite coating on steel, zinc, and aluminum simultaneously.

No need now to separate these metals on the finish line. Steel, zinc, aluminum – and their alloys – can travel a single conveyor line from cleaner to paint booth. Quickly, simply, economically, and with equal effectiveness, the Spra-Bonderite process converts these metal surfaces to the characteristic nonmetallic phosphate coating of paint-holding, corrosion-resistant Bonderite.

Now, *all* the parts of your product – whether made of aluminum, steel, zinc, or alloys of these metals—can have the lasting benefits of Bonderizing under the paint finish!

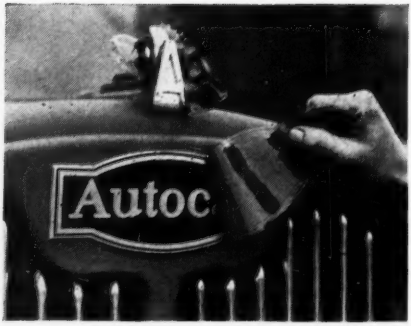
Learn how this process can add longer lasting fine finish and appearance to your product. Write today for full information on Bonderizing for Mixed Production.

Bonderite, Parco, Parco Lubrite—Reg. U. S. Pat. Off.

PARKER

PARKER RUST PROOF COMPANY
2172 East Milwaukee Ave.
Detroit 11, Michigan

BONDERIZING Holds Paint to Metal . . . PARKERIZING Inhibits Rust . . . PARCO LUBRIZING Retards Wear on Friction Surfaces



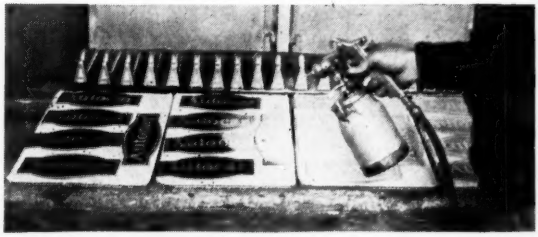
After Autocar trucks have been assembled and spray-painted, the coating protecting chromium plated parts can be removed readily as shown.
(Photo courtesy Autocar Co., Ardmore, Pa.)

Plastic Coating Protects Chrome Plated Parts During Assembly

AT the Autocar Company, truck manufacturer of Ardmore, Pa., chromium plated parts are masked with a sprayed-on strippable plastic coating prior to assembly. In the course of manufacture, the parts are assembled to the truck body and the entire assembly is spray-painted on a production line. After finishing operations are completed, the plastic coating, covered with chassis paint, can be peeled off readily. The chrome plated parts so protected emerge with their bright finish unimpaired.

The plastic coating, known as Water Emulsion Liquid Envelope No. RX-3229, can be applied with a cup spray gun. A touch of color has been added to the plastic so that coated parts may be identified as such at a glance.

According to Autocar officials, many purchasers prefer that the coating be left on the parts as a protection during the shipment of same.



Strippable plastic coating being applied to Autocar nameplates and radiator ornaments
(Photo courtesy Autocar Co., Ardmore, Pa.)

Wire Brushing Provides Finish for Light Metal Parts

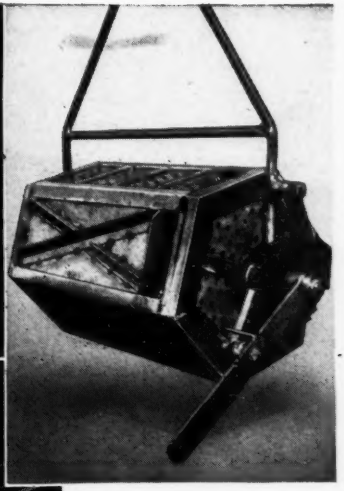
IN the plant of a railroad supplier manufacturing heavy-duty air brakes, several brake parts made of light metals are finished by wire brushing. The interior surface of the aluminum brake cylinder is brushed with a 3¾-inch Osborn wire wheel brush, containing 0.0095-inch wire. The operation is performed on a polishing lathe operated at 2,000 r.p.m. This treatment provides an interior surface that is designed to hold lubricating fluids.

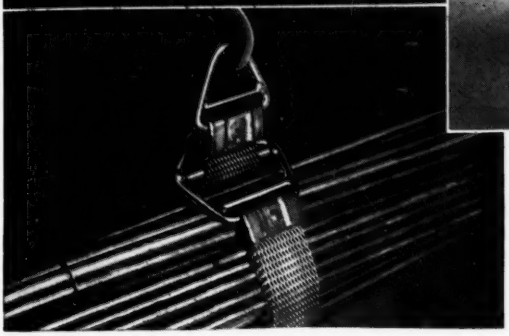
Brass brake pistons are first ground and then brushed to deburr rough edges and form proper radii. A Riehl type brushing wheel 12 inches in diameter, operated at 1,300 r.p.m., is used in performing this finishing operation.

The spring shaft and aluminum cover of a steam compressor lubricator are deburred by wire brushing. Burrs remaining on the spring shaft after

SEE *Cambridge* first

when you need FABRICATED WIRE ASSEMBLIES for bulk processing





Representative baskets, racks, crates, and trays, built by Cambridge, for product processing or movement.

Call in a Cambridge field engineer to discuss the proper type of fabricated wire units for your bulk handling operations. Let us show you how Cambridge Engineered wire fixtures are specially built from any metal or alloy for any bulk operation — plating, dipping, spraying or heat treating.

Or, for information on the entire Cambridge line, write for your FREE copy of this illustrated folder.

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CAMBRIDGE WIRE CLOTH CO.

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BOSTON • NEW YORK • BALTIMORE • PITTSBURGH
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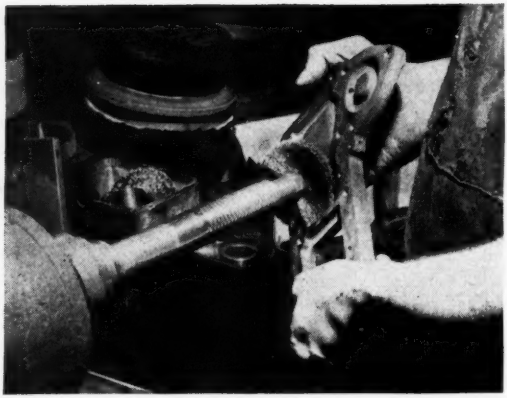

Illustration showing the use of a wire brush to deburr an aluminum lubricator cover

the milling operation are removed with an Osborn 8-inch master wheel containing 0.005-inch wire. The aluminum lubricator cover is brushed with a 3-inch brush operated at approximately 3,000 r.p.m., as shown above.

"Protective and Decorative Finishing" is the title of a 14-page booklet announced by H. S. Products Finishing Corp., 1768 Dean St., Brooklyn 33, N. Y. The booklet describes the various steps through which products are processed in the course of finishing operations. The various types of finishes produced are described with illustrations in color showing various completed products. Copy free upon request.

Rodine Pickling Inhibitor is described in a four-page technical service data sheet announced by American Chemical Paint Co., Ambler, Pa. The properties and uses of Rodine are discussed and industrial applications of the product are suggested. Copy free upon request.

LARGE CASTINGS—SMALL METAL PARTS—LONG THIN PIPES ARE THOROUGHLY AND QUICKLY CLEANED IN A

BLAKESLEE

SOLVENT *Vapor* DEGREASER

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BLACOSOLV DEGREASERS AND SOLVENT

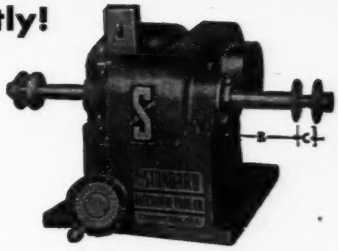
NIAGARA METAL PARTS WASHERS

G. S. BLAKESLEE CO., CHICAGO 50, ILLINOIS · New York, N. Y. · Toronto, Ont.

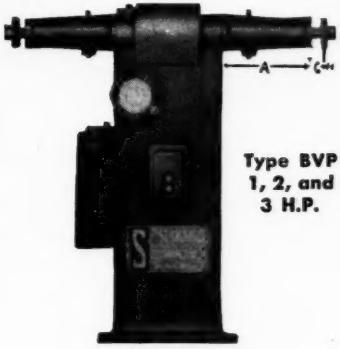
BUFFING AND POLISHING MACHINES

1500 to 3000 r.p.m., Instantly!

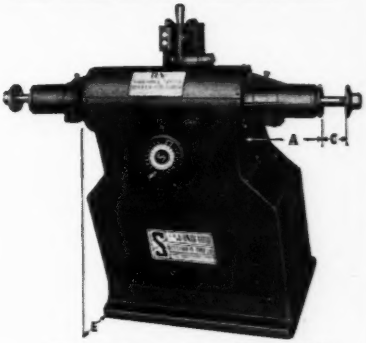
The Standard Infinitely Variable Speed Buffer and Polisher with its *Speedial* Control gives you any spindle speed from 1500 to 3000 r.p.m. instantly.



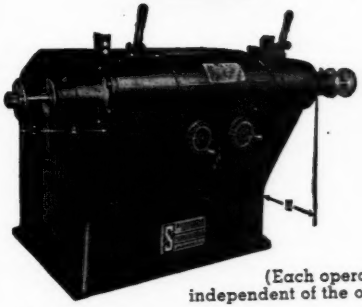
Type IBVB 1 H.P. Bench Model
Also furnished in Pedestal Model.



Type BVP 1, 2, and 3 H.P.



Type RV. 3, 5, and 7½ H.P.

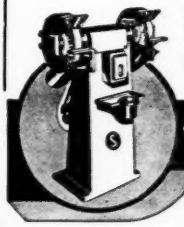


(Each operator is independent of the other.)

Type R2V. Independent Spindles. Two 7½ H.P., and Two 3 H.P., Two 5 H.P.,

15 MODELS FROM 1 H.P. TO 20 H.P.

- **Maintains peripheral speed throughout wheel life.**
- **Gives you maximum usable wheel life.**
- **Lower production costs.**
- **Higher production.**
- **Also available in single or multiple speeds from ½ to 60 H.P.**



VISIT OUR BOOTH 101 at Industrial Finishing Exposition, Atlantic City, June 28-July 1, and see these machines in operation!

The STANDARD ELECTRICAL TOOL Co.
CINCINNATI · 4 · OHIO
2518 RIVER ROAD

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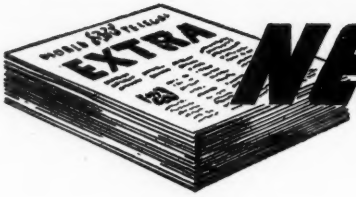


NEWS of the Industry

Gilbert Tramer Appoints Ruleff

Robert Ruleff has been placed in charge of the Dayton, Ohio office of The Gilbert Tramer Co., 402 Swetland Bldg., Cleveland 15, Ohio, manufacturer of polishing and plating equipment. The Dayton branch, which is located at 830 Gas & Electric Building, serves the Southern Ohio territory.

Robert Ruleff

Mr. Ruleff has a B. S. degree in chemical engineering from the University of Pennsylvania, which he received in 1942, and is a member of the American Electroplaters' Society, American Chemical Society, and American Society for Metals. Mr. Ruleff will continue the company policy of offering engineering and planning service on the installation of polishing and plating equipment.

Udylite Annual Sales Conference

Prediction of a further increase in the 1948 sales volume of The Udylite Corporation, manufacturer of plating equipment, was made by Sales Manager L. V. Nagle at the company's annual sales conference held in the Hotel Statler at Detroit, March 8-10. The first day of the meeting, those present previewed a new type plating machine. In addition, company engineers covered the various phases of present equipment, including engineering changes, and so on. The second day was devoted to a panel discussion of the latest developments in plating processes and was climaxed by a "question box" quiz.

The final day's meeting was highlighted by an outline of the Udylite advertising program for 1948 by Edward R. Grace, vice president of Grant Advertising, Inc. At the annual banquet which concluded the conference, L. K. Lindahl, president, presented a gold pocket watch to A. B. Hoefer, New York district manager, as a token of appreciation for the completion of 20 years of service with the company.

Chicago District Representative

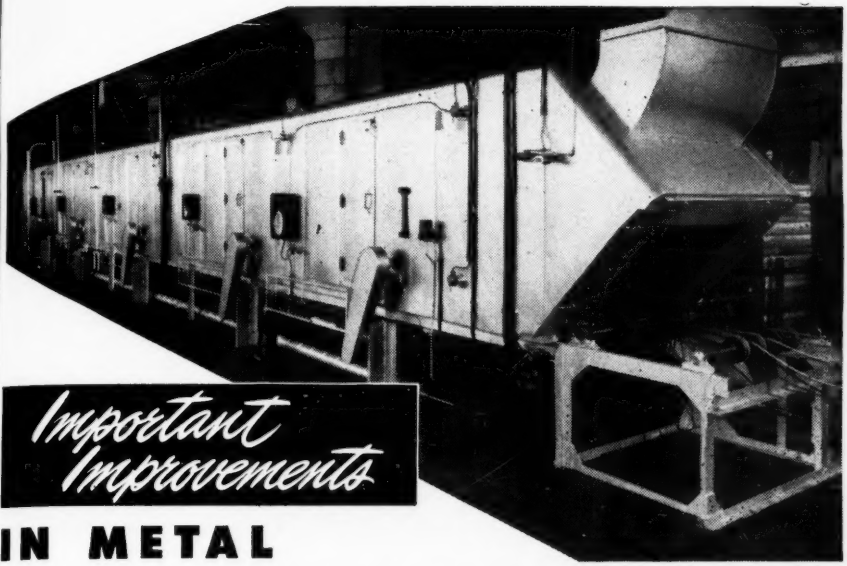
Hugh R. Bishop has been named sales representative in the Chicago territory for the Heavy Chemicals Division of the Pennsylvania Salt Manufacturing Company, according to R. S. Roeller, Field Sales Manager.

Mr. Bishop, a graduate of Lehigh University, joined Pennsalt in 1939. He entered the army early in 1941 and held the rank of lieutenant-colonel in the Army Air Corps when separated from service in 1946. Upon his return to Pennsalt, he was named manager of the company's New Products Division.

In his new post, Mr. Bishop will succeed C. Harvey Anderson, recently transferred from Chicago to the Wisconsin and Minnesota territory.

Dimacheff Joins Martin Varnish

Boris "Babe" Dimacheff, halfback with the Chicago Cardinals, professional football champions, has joined the sales staff of Martin Varnish Company, Chicago, according to an announcement made by R. P. Edmonds, general manager.



Important Improvements

IN METAL DECORATING OVEN

The new Young Brothers metal lithographing oven is designed to take full advantage of rapid heat input and heat recuperation, rapid cooling and automatic unloading. The following are some of its outstanding advantages:

1. Higher speed, and consequently more uniform heating of the work, reducing the over-all length of the equipment required.
2. Greater fuel economy, utilizing recuperative cooling.
3. Extremely high degree of uniformity while the sheets are at operating temperature.
4. Minimum of heat losses to the building room since the sheets are cooled within a few degrees of room temperature before they leave the insulated section of the oven, and since the heat radiation surface of the oven is a minimum.
5. Minimum of adjustments necessary, simplifying the job for the operator.
6. Minimum floor space and ceiling height required.
7. Wide degree of flexibility, by simple control adjustments, for low or high temperatures.

ask for an estimate on an installation to meet your specific requirements.

YOUNG BROTHERS COMPANY

6513 MACK AVE. • DETROIT 7, MICH.

YB CO ESTABLISHED IN 1898

(Left to Right) Rosemary Duff, L. K. Lindahl, and Helen McKay

Udylite Employees Honored

Two employees of the Udylite Corp., 1651 E. Grand Blvd., Detroit 11, Mich., manufacturer of plating equipment, were honored recently at a special banquet held in the Hotel Biltmore, New York, as they joined the company's exclusive Twenty-Year Service Club. L. K. Lindahl, Udylite president, presented wrist watches set with 20 diamonds to Rosemary Duff of New York, the company's oldest woman employee, and Helen McKay of Detroit, his private secretary. In addition, both employees received the usual 20-year gold pin.

Elected Board Member

Leonard T. Beale, president of the Pennsylvania Salt Manufacturing Company, has been elected a member of the National Industrial Conference Board. The Conference Board is an independent non-profit organization sponsoring research and education in the fields of economics and business.

Corrosion Authorities Receive N.A.C.E. Awards

Two eminent research authorities, Dr. Ulick R. Evans and Dr. John M. Pearson, have been named recipients of the 1948 awards of the National Association of Corrosion Engineers, according to an announcement made by G. R. Olson, president of the association. Dr. Evans has been honored with the Willis Rodney Whitney Award in Corrosion Science and Dr. Pearson with the Frank Newman Speller Award in Corrosion Engineering. These awards are made annually by the N.A.C.E. in recognition of outstanding contributions in science and engineering as pertaining to the field of corrosion.

Dr. Evans was signally honored in recognition of his outstanding contributions to the fundamental knowledge on which the practical control of corrosion is based. Dr. Pearson's award was for his outstanding service in the application of scientific research in the prevention of corrosion, particularly by cathodic protection of underground structures.

Milwaukee Branch of A.E.S. Annual Educational Meeting

The Milwaukee Branch of the American Electroplaters' Society will hold its Annual Educational Meeting and Banquet at the Schroeder Hotel in Milwaukee, Saturday, April 24, 1948. The Educational Session, starting at 2:00 p. m., will feature a discussion of postwar finishes by the following speakers: Mrs. Gladys Obendorfer, Training Superintendent of Buyers, Gimbel Brothers Department Store; Mr. Frank Savage, Vice President, Standard Plating Rack Company; Dr. R. B. Saltonstall, Technical Director, Udylite Corporation; and Dr. R. H. Schaeffer, Technical Director, Cleveland Graphite Bronze Company.

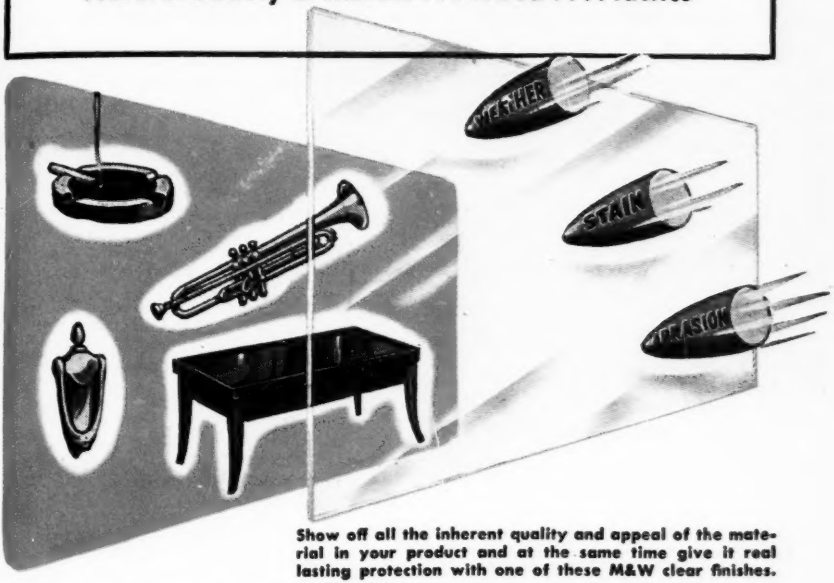
A banquet following the Educational Session together with music and entertainment will conclude the program.

A. W. Reynolds Promoted

A .W. Reynolds has been appointed assistant to the executive sales manager of the Southern Alkali Corporation and the Columbia Chemical Division of Pittsburgh Plate Glass Company. Southern Alkali with plants at Corpus Christi,

LIKE BULLET-PROOF PLATE GLASS

M&W's Clear Finishes Reveal and Protect the Natural Beauty of Metals . . . Wood . . . Plastics



Show off all the inherent quality and appeal of the material in your product and at the same time give it real lasting protection with one of these M&W clear finishes.

CLEAR SYNTHETICS that can be flash-baked, slow-baked, air-dried—in fact formulated for practically any finishing schedule—are available for wood, metals or plastics. They enhance the natural surface beauty of a product . . . form a transparent, haze-free film that is flexible, tough, resistant to weather, heat, stains and abrasions. Suitable for spray, dip or brush application.

CLEAR LACQUERS of M&W are well known for their uniform water-whiteness and unusually good adhesion even to metals ordinarily considered difficult to finish. They dry out of dust in a few minutes . . . harden throughout in one hour. With M&W clear lacquers, polished metals retain natural color and brilliance . . . take on lasting protection against stains, corrosion, weather, cold, heat—even cigarette burns. Suitable for spray, dip or brush applications.

By letting us help you choose the right clear finish for your product, chances are we can save you time, expense and experimentation. Just contact your nearest M&W representative or write directly to any of the offices listed below.

PIONEERS IN PROTECTION M&W Co. 1876

. . . where industry goes with finishing problems

MAAS & WALDSTEIN COMPANY NEWARK 4, NEW JERSEY

Boston 15, Mass. • Chicago 12, Ill. • Los Angeles 34, Calif.
Pacific Coast Division: SMITH-DAVIS CO., 10751 Venice Boulevard, Los Angeles 34
PRODUCERS OF LACQUERS, ENAMELS, SYNTHETICS AND SPECIALIZED PRODUCTION FINISHES

Texas and Lake Charles, Louisiana is owned jointly by the Pittsburgh Plate Glass Company and American Cyanamid Corporation.

Jensen Appoints Representative

J. E. Sump, sales manager for Jensen Specialties, Inc., Detroit, Mich., manufacturer of conveyors and infra-red ovens, announces the appointment of a representative for the entire state of Indiana and the Cincinnati district of Ohio; namely, Ralph D. Hawkins Associates, 31 East Georgia Street, Indianapolis 4, Indiana.

Ralph D. Hawkins

Ralph D. Hawkins graduated in 1923 from the Ohio State School of Metallurgical Engineering. Since that time he has been identified with industrial engineering and sales work on ovens and furnaces. He is a well-informed practical engineer and is experienced in modern production technique and problems.

Metal-Clean Names Representatives

The Metal-Clean Solvent Corp., 1935 N. Paulina St., Chicago, Ill., announces the appointment of the following representatives: Thomas Burke, 18216 Landseer Rd., Cleveland, Ohio; Clemco Chemical Co., 3614½ Divison, S., Grand Rapids, Mich.; Carlson Equipment and Supply Co., 1951 E. Ferry Ave., Detroit, Mich.; L. J. Kissling & Sons, 41 Union Square, New York, N. Y.; and J. H. Lightner, 428 E. King St., Lancaster, Pennsylvania.

The company also announces the addition to its staff of John Hieland who will be in charge of research and development work. Mr. Hieland comes to Metal-Clean with years of valuable experience, having formerly been with the Bell and Howell Company, Buick Motor Car Company, Aviation Division, and the Pure Oil Company.

Dr. J. J. Mattiello Honored

Dr. J. J. Mattiello, vice president and technical director of the Hilo Varnish Corporation, Brooklyn, N. Y., was unanimously elected a fellow of the New York Academy of Sciences at the recent annual meeting in recognition of his contributions to science. Election to fellowship is a distinguished honor, conferred on a limited number of active members who, in the estimation of the Council, have done outstanding work toward the advancement of science.

Dr. Mattiello was also recently chosen as one of the ten ablest chemists or chemical engineers in the field of paint, varnish and plastics now working in the United States. This honor was conferred through a poll held by the "Chemical Bulletin," publication of the Chicago Section, American Chemical Society.

Joins Smith-Davis Company

G. Klinkenstein, vice president of the Smith-Davis Co., 10751 Venice Blvd., Los Angeles 34, Calif., manufacturer of specialized production finishes, trade sales finishes, and maintenance finishes, announces the addition of two men to its staff.

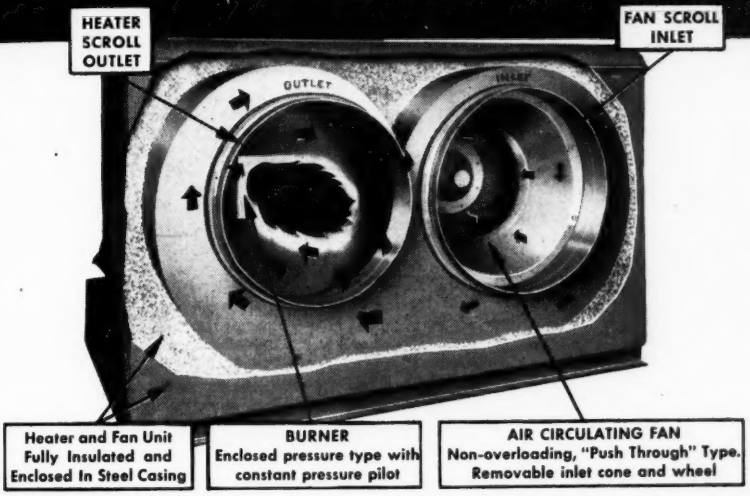
Murray M. Win

Dr. K. J. Keating has been appointed manager of the Smith - Davis Company, which is a division of the Maas & Waldstein Co., Newark, N. J. Dr. Keating received his education at North Dakota Agricultural College where, upon completion, he was retained by that institution for two years to serve as instructor in paint, varnish, lacquer, and industrial chemistry. Prior to his joining the Smith-Davis Company, Dr. Keating was associated with several national organizations in executive capacities.

Murray M. Win has been appointed to the sales staff of the Smith-Davis Company and will cover a large section of the Los Angeles territory. Mr. Win has had many years of experience in the field of specialized production finishes, having served as sales engineer for some Eastern finish manufacturers.

NEWCOMB-DETROIT

Scroll-Aire DIRECT-FIRED OVEN HEATER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FAN SCROLL INLET
OUTLET
INLET
Heater and Fan Unit Fully Insulated and Enclosed In Steel Casing
BURNER
Enclosed pressure type with constant pressure pilot
AIR CIRCULATING FAN
Non-overloading, "Push Through" Type. Removable inlet cone and wheel

WITH DUAL BURNER ARRANGEMENT TO BURN

Gas AND/OR Oil Fuel

Established 1912

NEWCOMB-DETROIT COMPANY

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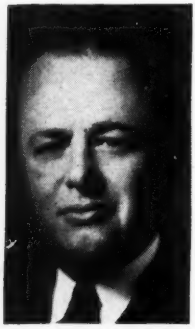
GRAND RAPIDS, MICH.

Main Office and Plant
5741 Russell Street
DETROIT 11, MICHIGAN

Western Sales Office
CHICAGO, Ill.

Named Manager of Sales

Van Winkle Todd, president of the Optimus Detergents Co., Matawan, N. .J, announces the appointment of Clark Moore as manager of sales. Mr. Moore brings to Optimus a wealth of experience in the sale of industrial products. Prior to joining the company, he was sales manager of the asphalt paving and industrial sales division of the Barber Asphalt Corporation.



Clark Moore

During the war, Mr. Moore was with the New York office of the War Production Board as chief engineer and later went with the Smaller War Plants Corporation as assistant regional deputy director. Previous to his work with the Government, Mr. Moore was president and general manager of the Equitable Asphalt Maintenance Corporation, Kansas City, Missouri.

Personnel Changes Announced

The following personnel changes have been announced by W. I. Galliher, executive sales manager for the Columbia Chemical Division of Pittsburgh Plate Glass Co., 5th and Bellefield, Pittsburgh. Pennsylvania.

Robert M. Simpson has been appointed district sales manager with headquarters in Chicago. Brooks M. Dyer has been named assistant district sales manager at St. Louis, Missouri. C. C. Thompson, credit manager for Columbia, will continue in that capacity and also assume the responsibility of office manager at the division's headquarters.

Paul R. McHail, associated with the firm since 1946, has been appointed manager, order and service department, with headquarters in Pittsburgh.

Moves Western Divison Office

In order to improve its service to customers and handle its expanding operations more efficiently, the Western Division office of Nuodex Products Company. Inc., manufacturer of driers, wetting and grinding aids, and fungicides for the paint and allied industries, has moved to new and larger quarters at 505 North La Salle Street, Chicago, according to John W. Van Tuin, division sales manager.

The new office provides adequate office and conference room facilities so that customers may be informed concerning the products and services offered by the company. This is accomplished through visual displays and conferences with company representatives.

Operating out of the Western Division office, in addition to Mr. Van Tuin, are George H. Moyer, regional sales manager for the North Central region, and Robert A. Peterson, sales representative for the Chicago district.

Division Manager Named

John J. Hart, Jr. has been named sales manager of a recently formed division of The Watson-Standard Co., Pittsburgh, Pa., according to an announcement by Henry K. Watson, II. This division will service a new line of safety finish products for industry.

John J. Hart, Jr.

Mr. Hart comes to Watson-Standard from the Lake Erie Engineering Corporation, where he served as district sales representative and later as assistant manager of that firm's Feller Engineering Division.

Sherwin-Williams Promotes Hinig

Howard C. Hinig has ben promoted to assistant manager of industrial and transportation sales for The Sherwin-Williams Company of California, according to an announcement by C. M. Lemperly, Sherwin-Williams' vice president and director of sales. Mr. Hinig will have charge of coordinating the efforts of the various S-W factory points, salesmen, and the company's Cleveland headquarters with transportation and industrial operations on the West Coast. He will be stationed at Oakland, California.

LACQUER

TAKE YOUR LIQUOR STRAIGHT

Use an airline filter that really STOPS MOISTURE before it gets to your spray guns — that SHOWS YOU the moisture being trapped —that SIGNALS DANGER should any moisture be present in the upper (downstream) chamber!

ONLY THE NEW NORGREN PURAIRE REGULATOR UNIT DOES ALL THIS. But it does more: it regulates pressures and stops grit, rust, and pipe scale, too!

Get complete facts on this revolutionary new spray room device today.

Norgren

C. A. NORGREN CO.
222 Santa Fe Drive
Denver 9, Colorado

Barber Named Vice-President

I. J. Barber, director of engineering for the Fostoria Pressed Steel Corp., Fostoria, Ohio, has been promoted to vice president. Mr. Barber has been concerned with the development of infra-red equipment which Fostoria manufactures.

I. J. Barber

Before joining the Fostoria organization in 1943, he was associated with electric utility companies in New York, Atlantic City, and several Ohio communities. He is a graduate of Penn State College and is the holder of a degree in electrical engineering.

Benedict Gifford Passes

Benedict Gifford, president of the Gifford-Wood Company of Hudson, N. Y., died March 22 in New York City of a heart attack.

Mr. Gifford started his career with the Gifford-Wood Company working in the pattern shop during school vacations. Later, after being employed in each department in the plant, he entered the engineering department following which he did installation work. In 1914 Mr. Gifford became secretary of the company, after which he was made treasurer, vice president, and in 1923 president.

Enters Consulting Field

C. Fred Gurnham, chemical engineer, 72 Lake St., Hamden 14, Conn., announces his entrance into the consulting field as of March 1. In his consulting work Mr. Gurnham, whose education includes a B.S. degree in chemical engineering from Yale University and M. Ch. E. and D. Eng. Sc. degrees from New York University, will specialize in chemical manufacture, metal finishing, and waste disposal, although he will be available for chemical engineering work in any other industry.

During the past few years, Mr. Gurnham was with the Whitney Blake Co., New Haven, Connecticut.

LAST CHANCE
TO GET YOUR
PERIODIC REVERSER
AT ITS ADVERTISED INTRODUCTORY
PRICE OF
$49.50

After June 1st the regular price will be
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Our Products Include • Dr. L. C. Pan's Control Systems For Analyses of Plating Solutions • Nickellite, a Brightener for Barrel Nickel Solutions • Standard Chemical Reagents—Any Normality • Fine Chemicals and Indicators • Anode Bags • Surface Treatment Specialties.

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A NEW DEVELOPMENT FOR
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- Non Inflammable
- Used Cold
- Requires No Rinse
- Works Rapidly on All Types of Finishes
- Will Not React or Affect Any Metal, Ferrous or Non-Ferrous
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Samples and further information supplied on request.

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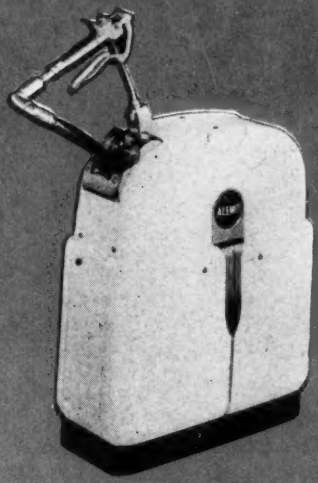
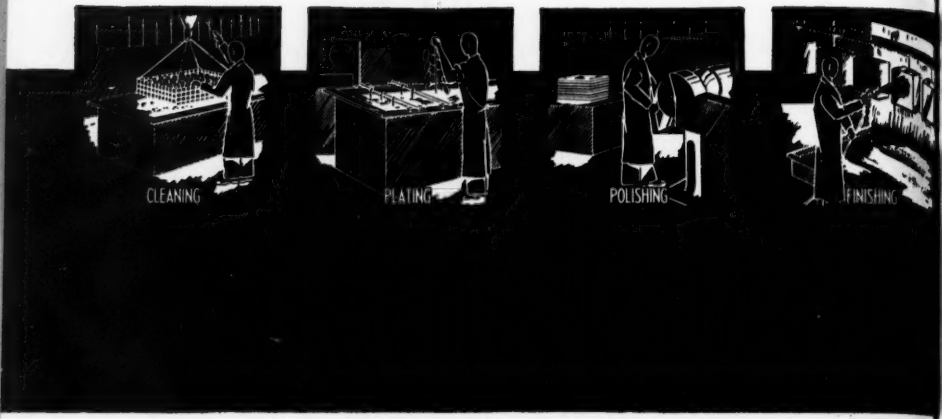


The finish on this steel Alemite hose reel used in automobile lubrication consists of a flat prime coat baked at 350 deg. F. for 1¼ hours and a finish coat of Lilly Varnish Company enamel baked in a similar manner. The trim and ornamentation are polished stainless steel.

(Photo courtesy Stewart-Warner Corp., Chicago 14, Ill.)

This cast aluminum picture frame is coated with Stylon flock, illustrating one application of flock finishes to metal products.

(Photo courtesy Bohr-Manning Corp., Troy, N. Y.)



Abrasive Belt Head for Packer-Matics

An abrasive belt head for Packer-Matic automatic polishing and buffing machines has been announced by the Packer Machine Co., Meriden, Conn. The head is interchangeable and provides for the use of buffs, polishing, Tampico and wire wheels, or abrasive belts.

According to the manufacturer the mounting design of the abrasive belt head has been standardized so that it is adaptable to most types of Packer-Matics now in service. The application of the abrasive belt head to an automatic polishing machine is said to increase the ability of the machine to handle redesigned products without a change in equipment. It is claimed that with the abrasive belt head, automatic buffing and polishing of such items as door knobs, cooking utensils, and various die castings can be accomplished readily.

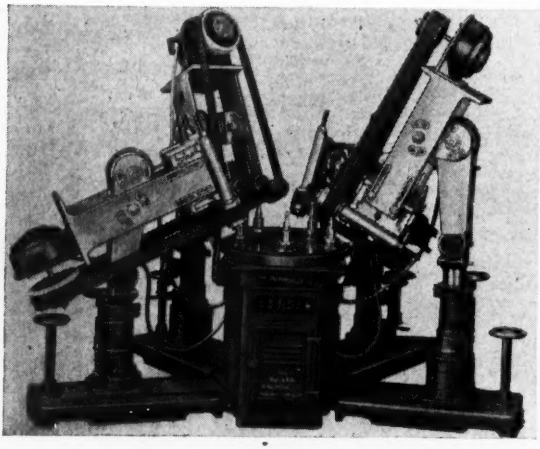


Illustration showing abrasive belt heads mounted on Parker-Matic Polishing Machine

"Oncrete" Paint

Designed to withstand the wear and tear of use in plants where acids and fumes attack wall and floor finishes, a long-wearing synthetic paint that is claimed to protect concrete surfaces with a corrosion-resisting finish that does not check, chip, or peel, is now being marketed under the trade name of "Oncrete" by Lowebco, Inc., 1525 E. 53rd St., Chicago 15, Ill. According to the manufacturer, the free - spreading paint dries to a hard durable glossy finish in three to four hours, seals concrete surfaces from moisture above or below, expands and contracts easily with the material covered, and resists alkalis, and extreme degrees of heat or cold.

Besides forming a protective covering on concrete, Oncrete paint can also be applied to exposed metals, machinery, boilers, and pipes and to porous masonry surfaces.

50% FASTER JOBS... much smoother finishes

Changing from setup wheels to 3M Abrasive Cloth Belts put this refrigerator manufacturer way ahead on production costs. Studies of his stainless steel weld grinding and finishing operations show that production is 50% faster, with far better finishes.

This is typical of many reports of spectacular results with 3M Abrasive Cloth Belts and 3M Contact Rolls. This *engineered* grinding and finishing method not only removes more metal per minute but also produces finishes that require little or no buffing... features that mean lower production cost and faster production time.

No matter what the surface to be finished, whether flat or contoured, molded or forged, there is a 3M *engineered* method to do the job for you faster and better. Ask your local distributor of 3M products for complete information on this cost-cutting method or use the coupon below to secure a free copy of our booklet "Step Up Production."

P F-448

Please send us a copy of your booklet "Step Up Production."

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3M ABRASIVE BELTS

ANOTHER 3M PRODUCT

Made in U. S. A. by

MINNESOTA MINING & MFG. CO.

Saint Paul 6, Minn.

Whatever your problem in finishing zinc or cadmium, there's an Iridite* to do the job. Iridite, a quick-dip, chemical treatment, offers you these three advantages:

1. EYE APPEALING FINISH . . .
On plated parts Iridite forms a long lasting, sparkling *bright* finish that *stays bright*, even after handling, storage, exposure. On all surfaces, Iridite can be used to produce a variety of colored finishes.

2. RUSTPROOFING . . .
Resistant to the attack of water, gasoline, and ordinary corrosive conditions, Iridite provides the ideal *final finish* for all zinc and cadmium surfaces.

3. BASE FOR PAINT . . .
On any zinc or cadmium surface that must be painted, Iridite insures a better finishing system because the coating improves initial paint adherence, blocks corrosion *under* paint, blocks metallic soap formation *between* paint and metal.

Tell us the type of finish you need for zinc or cadmium — let us tell you how Iridite can help. For information and samples, write to:

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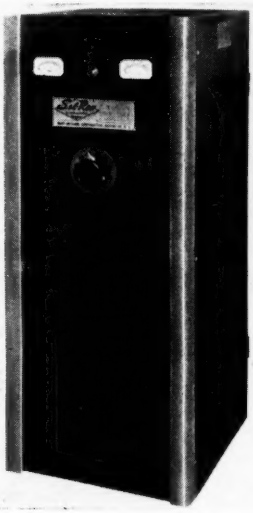
301 Chemical Building
4004 E. MONUMENT ST. • BALTIMORE 5, MD.
Manufacturers of
IRIDITE
DISTRIBUTORS IN PRINCIPAL INDUSTRIAL AREAS
*REG. U. S. PAT. OFF.

Sel-Rex Selenium Rectifier Style 750-12

A rectifier designed specifically for the barrel plating of zinc, cadmium, nickel, and copper has been announced by the Bart-Messing Corp., 45 Morgan Ave., Brooklyn 6, New York.

The unit, known as the Sel-Rex Selenium Rectifier Style 750-12, has been designed to provide for maximum efficiency and economy of operation. It furnishes



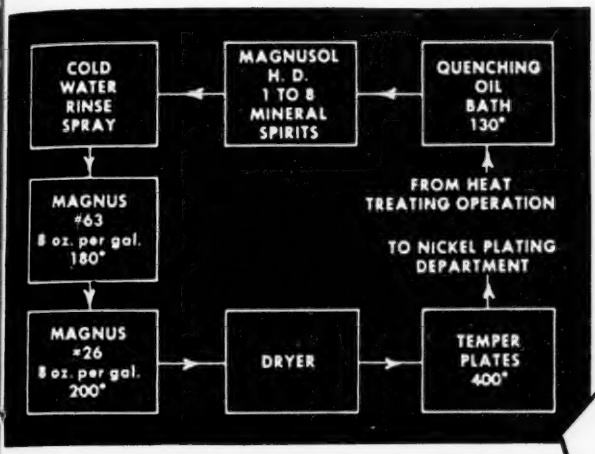
Sel-Rex Selenium Rectifier Style 750-12

750 amperes and can be adjusted for voltages from 9 to 12 volts by means of a tap switch. According to the manufacturer, certain features have been incorporated into the design to provide for safety of operation; namely, a magnetic contactor which disconnects the unit to protect the line in case of a short in the tanks, positive overload protection, and automatic positive protection against ventilation restriction.

Platecoil Tank Heater

A tank heater designated as "Platecoil" has been announced by the Platecoil Division of the Kold-Hold Manufacturing Co., Lansing, Mich. Designed to facilitate the manufacture of heated tanks with

Cutting Rejects by 80% in Finishing Manicure Files


COLD WATER RINSE SPRAY
MAGNUSOL H. D. 1 TO 8 MINERAL SPIRITS
QUENCHING OIL BATH 130°
FROM HEAT TREATING OPERATION
MAGNUS #63 8 oz. per gal. 180°
TO NICKEL PLATING DEPARTMENT
MAGNUS #26 8 oz. per gal. 200°
DRYER
TEMPER PLATES 400°

This Method Did the Job!

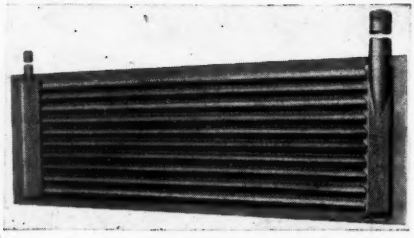
"Mottling" used to cause rejection of more than half the manicure files before plating in a large eastern plant. Heat treated files from the cutting room were hand dipped, cleaned in "plater's cleaner" and given an oil bath rust preventive treatment before plating.

The cure for rejects was in good precleaning with Magnusol, followed by effective alkaline cleaning in Magnus Heavy Duty Cleaner #63 and the dependable rust preventing action of Magnus #26. The acid dip was eliminated.

Rejects have been consistently reduced to 4% or less . . . and Magnus #26, plus the thorough removal of heat treating salt residues insured by the operation, has virtually eliminated rust troubles.

MAGNUS CHEMICAL COMPANY
208 South Ave., Garwood, N. J.
In Canada—Magnus Chemicals, Ltd., 4040 Rue Masson, Montreal 36, Que.
Service representatives in principal cities

IN METAL CLEANING IT'S
Magnus
CLEANERS • EQUIPMENT • METHODS



Platecoil Tank Heater

completely flat interior surfaces and without any protruding coils, the Platecoil Tank Heater can be installed in tanks which are in use or incorporated into tanks in the course of manufacture. The heater is made with a flat surface on one side and with the other side embossed to form channels for the circulation of the heating agent.

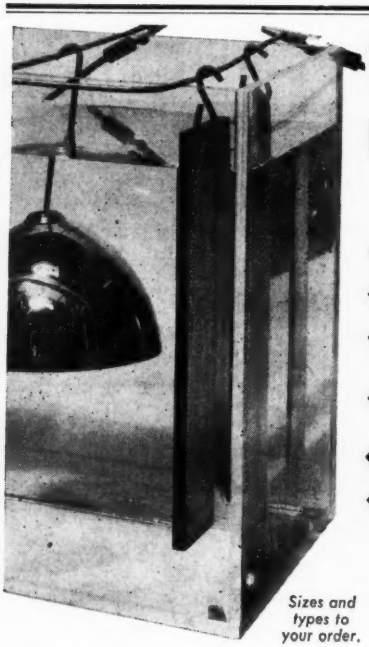
According to the manufacturer, the use of the Platecoil Heater makes possible tank construction and heat transfer plate installation in one operation. Further, it is said that tank maintenance is greatly simplified because of the ease with which the smooth surface can be cleaned.

The Platecoil Tank Heater is available in steel with metallized surfaces of various metals or in Monel, stainless steel or other specified metals. The form into which this type of heating element can be fabricated varies with the installation.

Sterling Portable Electric Sander Accessories

To provide for greater ease of operation and convenience, the Sterling Tool Products Co., 1340 N. Milwaukee Ave., Chicago 22, Ill., announces that its portable electric sander is now available with important new features and accessories. Side housing fenders, now standard equipment of the sander, are said to prevent scuffing when sanding in close quarters and provide protection to the transmission.

A new accessory for the Sterling Sander is an air scoop that is claimed to provide protection in performing extremely wet or dusty sanding operations. Another accessory in an auxiliary handle or knob which can be easily attached to



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Hi-temperature LUCITE tanks

Singleton-Weld — the perfect, no-leak seam*
Best for lab or production—Guaranteed

Permanent: Singleton-Welded, hi-temperature Lucite tanks last indefinitely. No deterioration.

Versatile: For all acids, alkalies. No contamination. Thermal, electrical insulator. Machineable.

Transparent: 11% clearer than glass. See your bath in action. Permits new techniques, improves old.

Rugged: High impact strength, modulous of elasticity, shatter-proof. Singleton-Weld tensile strength to 10,000 p.s.i.

Lightweight: Easy handling for variety of purposes.

Low Cost: A superior plating tank at a lower price. Reline your present tanks with Singleton Liners. Users say, *"The best we've used."*

*** Write for Bulletin and Price List.**

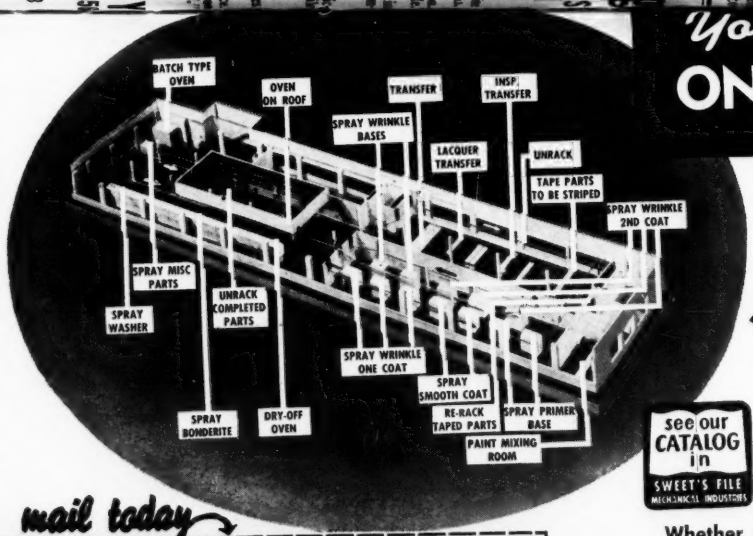
SINGLETON COMPANY
9823 Lorain Ave. ★ Cleveland, O. ★ WOodbine 905

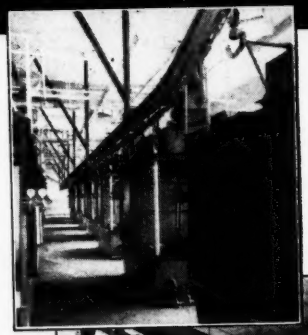
Your finishing System — ONE COMPLETE UNIT

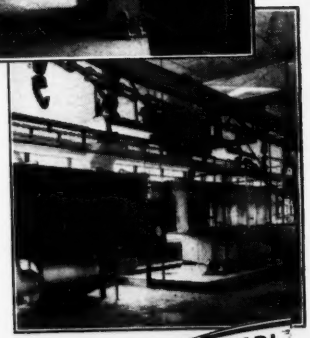
BATCH TYPE

Your Finishing System -

ONE COMPLETE UNIT







Many manufacturers with finishing problems instinctively turn to Peters-Dalton . . . they are assured of answers acquired from more than 20 years of successful installation and consistent research and development.

Whether your problems concern porcelain enamelling or organic finishing, our trained sales engineers stand ready to submit layouts, operational costs and equipment-estimates.

★

Shown at left is a mock-up of a job recently installed in a large typewriter plant

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HYDRO-WHIRL

the top of the housing on the sander. This knob is said to provide added support when an operator is sanding vertical or overhead surfaces for long periods.

"Safe-T-Vis" Safety Goggle

A safety goggle designed to provide the lightness, comfort, and safety features of plastic as well as to resist surface scratching has been announced by The Univis Lens Co., Dayton 1, Ohio. The goggle, known as the "Safe-T-Vis," is made of an allyl casting resin which is said to provide maximum surface hardness at reduced weight, thus assuring workers comfort and protection.

Safe-T-Vis lenses are available in four goggles styles and a variety of sizes.

"Kube-Kut" Sawdust

Sawdust designed primarily for the drying and polishing of metals and other materials has been announced by Michael Wood Products, Inc., 625 Midland Ave., Garfield, New Jersey.

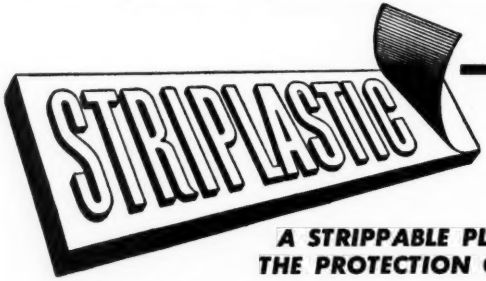
Designated as "Kube-Kut" (cube-cut), the sawdust is specially made from green maple wood, properly screened mechanically to ensure uniformity of size, and dried. According to the manufacturer, the absence of elongated slivers provides a material that separates easily from the products with which it is used. Kube-Kut does not pulverize readily in tumbling processes, it is claimed.

Kube-Kut Sawdust is available in a variety of meshes to suit individual needs.

New Pigmented Filmite Booth Masking Compound

New Pigmented Filmite, a paint spray booth masking compound which may be applied by spray or brush methods, has been announced by The DuBois Co., 1120 W. Front St., Cincinnati 3, Ohio.

According to the manufacturer, New Pigmented Filmite provides for maximum light reflectivity and dries to a firm, non-tacky surface providing good resistance to impact. It is claimed that Filmite will not flake, crumble, or dust; is heat resistant, making it applicable for booths near ovens; and is completely water soluble.



A STRIPPABLE PLASTIC FOR THE PROTECTION OF METALS

Striplastic is a protective plastic applied by spraying, dipping or rolling. It is used on stainless steels, high polished metal sheets, sheets in cold working or drawing, tools, dies and parts, and on sheets or metal parts before packaging. It protects against scratching and abrasion, and against rust.

Among many advantages, it is non-toxic, possesses great tensile strength and is easily stripped off in one piece.

Write for complete information on this new strippable plastic.

THE STRIPLASTIC COMPANY

10828 QUEBEC AVENUE • CLEVELAND 6, OHIO

FOR BIGGER PROFITS
Buff it with a VANOTT!

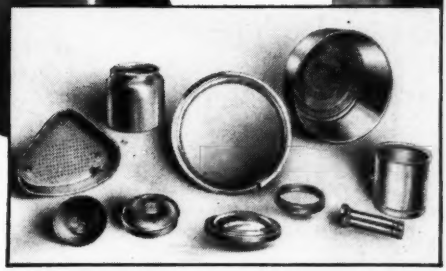
Production costs are down—production volume is up—and *profits are bigger*—when your buffing and polishing are handled by a Vanott Semi-Automatic Buffing Machine, Type V-1.

Pots, pans, trays, cylinders—an article of almost any shape and size can be buffed and polished on the Vanott V-1 machine with a finish of uniformly high quality. One man can easily operate two V-1 machines at once—one at either end of buffing lathe or jack—thereby speeding up production.

Heavy and sturdy, the V-1 has all vital mechanism enclosed to protect it from abrasive wear. Swiveling of the head is performed automatically by foot pedal—a special ease-of-operation feature.

We'll be glad to make a production-cost estimate based on samples of your work in rough and finished condition. No obligation, of course.

Write for further information or send samples for our estimate.



Typical examples of the wide variety of shapes handled on the Vanott V-1 machine.

VANOTT MACHINE CORP.
222 Colgate Avenue
Buffalo 20, New York

Richardson-Allen Tap Switch Rectifier

Richardson-Allen Tap Switch Rectifier

The Richardson-Allen Corp., 15 W. 20th St., New York, N. Y., has announced a selenium rectifier provided with 36 position tap switch controls. The tap switches are said to provide for maximum economy in installations where extremely fine settings are not required.

Standard units are designed for 36 position voltage taps (6 coarse and 6 fine) with two controls. Finer voltage steps for 60 or 100 tap positions are available for special requirements.

These units include voltmeter, ammeter, and 5,000-hour pilot light, and are standard up to 27 kw. capacity.

Radiant "Hi-Heat" 500-Watt Infra-Red Lamp

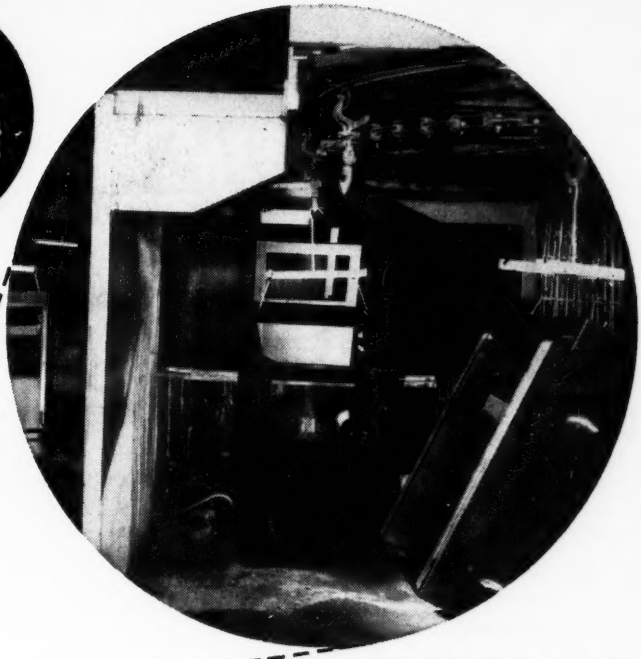
Introduction of a 500-watt infra-red lamp of the R-40 type is announced by the Radiant Lamp Corp., 300 Jelliff Ave., Newark 8, N. J. Designated as the "Hi-Heat," the lamp is made of special heat-resisting glass to withstand the high temperature of the filament and to reduce the hazard of breakage caused by sudden thermal shocks. This feature is said to be especially desirable in drying ovens containing volatile fumes.

The Radiant Hi-Heat Lamp is also available in 250 and 375-watt sizes. All lamps have medium clamp bases.

Hammond Model 50-DD Abrasive Belt Grinder-Polisher

Supplied complete with a built-in dust collector ready for grinding, polishing, chamfering, deburring, and removing fins on metal, plastics, ceramics, and other materials, the Hammond Model 50-DD Abrasive Belt Grinder-Polisher shown herewith has been brought out by Ham-

In the Spotlight



Right, foreground: Sheet steel electric range shells entering power spray washer to be cleaned and phosphate-coated with "DURIDINE".

Left: DURIDIZED shells, well conditioned for bonding paint, leaving washer.

Photograph courtesy of Hotpoint, Inc.

Duridize FOR A LASTING PAINT FINISH ON YOUR PRODUCT

CHEMICALS ACP PROCESSES

RUST PROOFING AND PAINT BONDING

Granodine ®
Duridine ®
Alodine ®
Lithoform ®
Thermoil-Granodine ®

RUST REMOVING AND PREVENTING

Deoxidine ®
Peraline ®

PICKLING ACID INHIBITORS

Rodine ®

Duridizing is very effective on all metals. The process is simple to control—uses a single chemical, "DURIDINE", which combines cleaning and phosphate coating—requires only mild steel power spray washers. Duridizing is equally suited to plants operating on full sale large production; and to plants faced with intermittent production.

"DURIDINE" is made, sold and serviced by a pioneer in the field of rust proofing.

Pioneering Research and Development Since 1914

AMERICAN CHEMICAL PAINT COMPANY

AMBLER, PENNA.

Manufacturers of Metallurgical, Agricultural and Pharmaceutical Chemicals

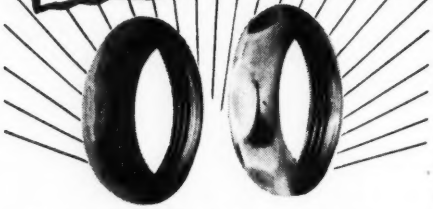
ROTO FINISH
Trademark Reg. U. S. Pat. Office

DOES CUT

DE-BURRING TIME

DIE CASTING COMPANY REPORTS . . . (NAME ON FILE)

"ONE MAN CAN DE-BURR AN AVERAGE OF 12,000 PIECES IN FIVE HOURS."



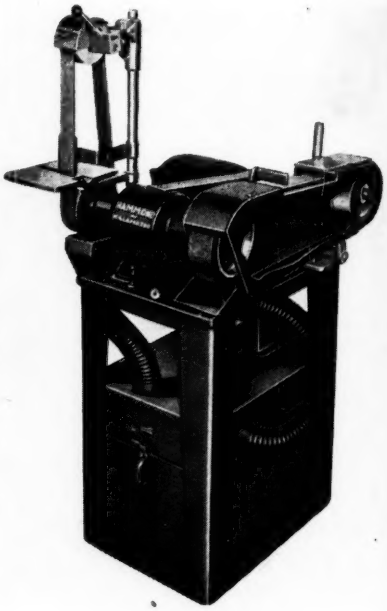
Unretouched illustration shows die cast plumbing fixture; at left before, and at right after Roto-Finish de-burring and finishing.

Roto-Finish processes quickly, uniformly, and accurately, enormous quantities of intricate castings and precision parts of steel, brass, aluminum, magnesium, stainless and nickel steels. One operator handles several Roto-Finish machines, allowing a tremendous saving in costs. Send samples for processing. (Include finished part for guide.) No obligation.

THE STURGIS PRODUCTS CO.
429 JACOB ST., STURGIS, MICHIGAN

mond Machinery Builders, Inc., 1622 Douglas Ave., Kalamazoo 54, Mich. The machine, which requires no exhaust system, is of heavy duty compact construction, and is furnished complete as shown except for contact wheels and motor. It can also be obtained in a bench model, if desired.

Specifications of the Hammond Model



Hammond Model 50-DD Abrasive Belt Grinder-Polisher

50-DD Abrasive Belt Grinder-Polisher are as follows: spindle speed, 2,500 r.p.m.; arbor, ¾-inch diameter; widest wheel with straight sides, 2-inch width; widest wheel with recessed sides, 3-inch width; distance between wheels, 14¾ inches; right-hand end of spindle tapped ⅜-16 U.S.S. for taper point; abrasive belt speed, 5,200 s.f.m. with 8-inch diameter contact wheels and 3,900 s.f.m. with 6-inch diameter contact wheels; length of abrasive belt accommodated, 60 inches; maximum width of abrasive belt accommodated, 3 inches; top of bench to center of spindle, 8 inches; motor recommended, 1 h.p.; and floor space required, 25 x 33 inches.

You can produce on any material the following surface finishes:

FELT - SUEDE LEATHER - MOHAIR VELOUR - VELVET - CARPET

FUNCTIONAL USES

Used in the auto, airplane, radio, electrical, phonograph, ceramics, furniture and many other industries for surfacing all sorts of materials to provide

TEMPERATURE INSULATION • SOUND DEADENING • INTEGRAL GASKETS • SHOCK ABSORBING SURFACE • NON-MAR SURFACE • NON-GLARE SURFACE

DECORATIVE USES

Applied in various lengths and colors to wood, paper, cloth, metal, etc., the following effects are produced—

FURNITURE UPHOLSTERY • SUEDE LEATHER • INTERIOR AND DRAPERY FABRICS • VELVET • VELOUR • MOHAIR • CARPET

with these patented and trademarked Rayco specialties:

FELT AND SUEDE SURFACE

*"Raymix"—a flock of rayon fibres, trademarked under U. S. No. 427949 to produce a suede effect of utmost realism on any surface.

*"Kingcote"—a cotton flock trademarked under U. S. No. 423572, producing a suede effect at minimum cost.

MOHAIR, VELOUR AND VELVET SURFACE

"Raycote"—a flock composed of uniformly cut rayon fibres to produce on any surface a pile effect such as velvet, plush, or velour. Made under U. S. Patent No. 2014947.

SYNTHETIC CARPET

"Harecote"—a flock composed of animal fibres, produces a durable carpet or rug material.

Request Free Color Card of Actual Samples

Rayon Processing Co. of R. I., Inc.* *Registered Trademark*

PIONEER PRODUCERS OF SURFACE COATING FLOCKS

65 MOSHASSUCK STREET • PAWTUCKET, R. I.

POLLAK PAINT CO.
715 Main St.
Buffalo, N. Y.

LAMBERT-NEW ENGLAND CO.
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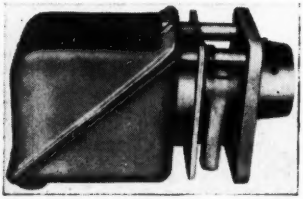
Boston, Mass.

H. R. MEININGER CO.
409 16th St.
Denver, Colo.

J. GORDON SMITH CO.
3901 Main St.
Dallas, Texas

Photoelectric Scanner Type 45PH5

A photoelectric combustion safeguard designed to provide flame failure protection on oil burners has been announced by



Photoelectric Scanner Type 45PH5

the Combustion Control Corp., 77 Broadway, Cambridge 42, Massachusetts.

The device, known as Photoelectric Scanner Type 45PH5, consists of a phototube and a vacuum amplifier housed in a compact dust-tight aluminum case and mounted on the oil burner so that the oil flame may be viewed by the scanner. Features of the equipment are said to include an optical system incorporating a special heat absorbing filter and a hinged shutter which provides for lens cleaning without shutdown of the burner.

The Scanner Type 45PH5 is used in combination with Control Type 24QJ5 to provide operating protection of the oil burner installation, and is said to guarantee instantaneous burner shutdown in case of flame failure. If starting protection and automatic ignition are also required, the Scanner Type 45PH5 is used with Programmer Type 24PJ8.

Reliance "Levalarm"

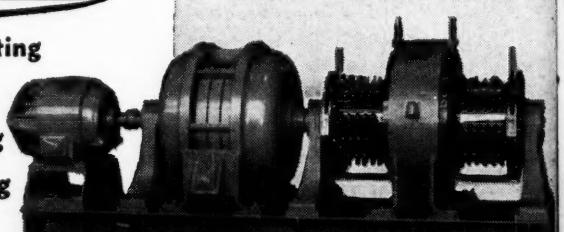
A device to set off warning signals when liquid levels in small boilers or various types of tanks reach predetermined low or high levels has been announced by The Reliance Gauge Column Co., 5902 Carnegie Ave., Cleveland, Ohio.

The warning signal, known as the "Levalarm," may be used on equipment operating under pressures up to 250 lb. A Monel float rising or falling in a separate float chamber in combination with a permanent magnet actuates an electric switch which sets off a warning signal that is either audible or visible or both. The Levalarm is said to be sturdily built but sensitive to liquid level variations.

Motor Generators
by
COLUMBIA

For Electroplating
Anodizing
Electrocleaning
Electropolishing

There's a Columbia M-G Set available for your needs, whether you have a small plating bath or a large continuous strip plating line. Capacities up to 20,000 Amperes; 6 Volts and up. Dependable, performance proved, for many years. Your inquiries solicited.



COLUMBIA ELECTRIC MFG. CO.
4535 HAMILTON AVE. — CLEVELAND 14, OHIO

Write for Catalog PF-700

Follow the Big Chief's Advice — Impurities Vanish When DARCO is Used to Keep Solutions Clean

Colloids and organic matter will pass through a mechanical filter no matter how fine the filter medium may be. But these impurities, which will pollute your plating solutions, vanish completely when the DARCO* S-51 treatment is given. They are adsorbed —removed entirely.

With your solutions completely clean you can do beautiful trouble-free work in bright nickle, copper, iron, zinc, cadmium, tin, gold and silver.

DARCO is America's oldest trade mark for activated carbon. It stands for a quality product and moreover DARCO technicians will answer your questions concerning ways to increase quality and production.

DARCO

DARCO CORPORATION

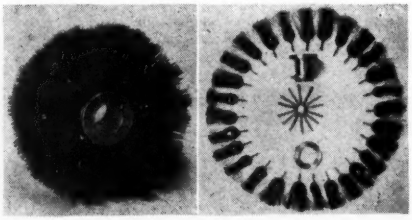
*Darco—Reg.U.S.Pat.Off.

60 E. 42nd Street, New York 17, N. Y.

Is your plating bath as clean as the water used in your final rinse?

H-VW-M Satin Finish Hanger Brush

A satin finish hanger brush composed of individual tufts supplied with S-hooks



Illustrations compare completely assembled satin finish brush (left) with its component parts (right)

for easy assembly has been announced by the Hanson-Van Winkle-Munning Co., Matawan, N. J. The tufts for the satin finish brush are mounted on rods parallel to the axis of the hub. To assemble the satin finish brush from its component parts is said to be a comparatively simple job, which consists of slipping the rods through the S-hooks attached to each brush tuft. According to the manufacturer, this design provides the swing action required for a smooth satin finish.

Oakite Di-Sanite

A chemical material possessing the dual ability to clean and deodorize in a single, simultaneous operation has been announced by Oakite Products, Inc., 20 Thames St., New York 6, N. Y. The material, known as Oakite Di-Sanite, is a fine free-flowing powder, mildly alkaline, that is readily soluble in hot or cold water and which is said to possess pronounced wetting, penetrating, and detergent properties, as well as a deodorizing action. The material is safe to use, free from abrasives and harmful ingredients, and its solutions may easily be applied on surfaces by simple sponging, wiping, or mopping, the manufacturer states.

Suitable for use in practically every industry, Oakite Di-Sanite is claimed to be highly effective in destroying objectionable odors at the source in factories, metal plants, and so on.

YOU CAN'T MISS . . .

when you specify HARRISON 4-A buffing and polishing compounds!

- Cut faster
- Clean easier
- Cost less

Stay on target with Harrison 4-A Products. Our 25 years of experience exclusively with buffing and polishing compounds assures you of the *right* compound for the *right* metal.

Harrison & Co., Inc., Haverhill, Mass.

THE VARNISH PRODUCTS CO.

MAKERS OF

CEL-U-LAK Lacquers and Enamels

FORM-A-ROC—alkyd-amine enamels

ALSO

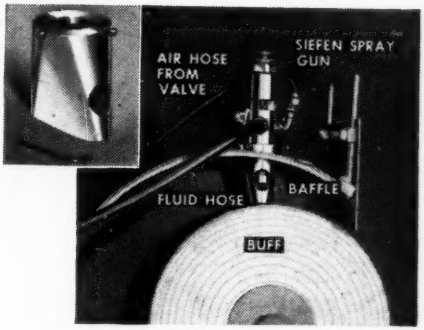
Bronzing vehicles, adhesives and other specialties for the industrial finishing of wood, metal, ceramics and plastics.

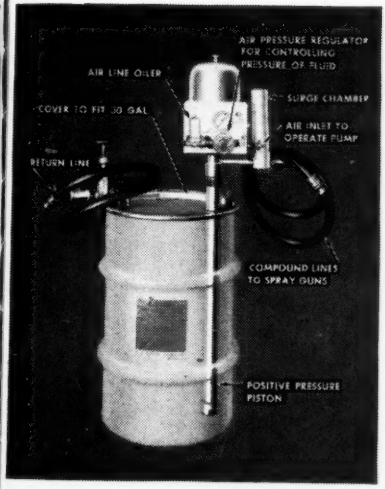
5206 HARVARD AVENUE
CLEVELAND, OHIO

SIEFEN CO. CONTINUES . . . . NOT ONLY TO IMPROVE THEIR COMPOUND BUT ALSO THEIR EQUIPMENT FOR SPRAYING . . . . !

BAFFLE for Siefen Spray Guns →

Prevents a lot of overspray and wastes less compound; more goes on wheel. Simple to attach and use. Very effective for Siefen Spray method, as gun can be mounted in almost any position.




AIR PRESSURE REGULATOR FOR CONTROLLING PRESSURE OF FLUID
AIR LINE OILER
SURGE CHAMBER
COVER TO FIT 30 GAL.
AIR INLET TO OPERATE PUMP
RETURN LINE
COMPOUND LINES TO SPRAY GUNS
POSITIVE PRESSURE PISTON

← CIRCULATING PUMP

For any number of guns this circulating pump provides liquid buffing compound at proper pressure for each gun. Circulates compound — permits use of larger drums at economical prices — Replaces Pressure tanks.

AND REMEMBER —

NUGLU is a liquid cold glue for setting up polishing wheels — can be used for recoating belts.

J. J. SIEFEN COMPANY

5633 LAUDERDALE . . DETROIT 9, MICH.

Conforming Matrix Electro-Formed Metal Masking Template

A form-fitting electro-formed metal masking template for use in the rapid and economical spray painting of sunken or raised areas of metal or plastic parts is announced by the Conforming Matrix Corp., 356 Toledo Factories Bldg., Toledo 2, Ohio. According to the manufacturer, the template does not deteriorate or lose its form during cleaning and frequently permits bright durable enamels, one color after another, to be wet painted before baking on many convex, concave, or irregularly shaped three-dimensional parts. Clean-cut, sharply defined letters and effects on even small emblems of the most intricate design are said to be obtained with the template, which includes a thin strong lip of metal that fits into the edge of the debossed area that is to receive paint and traps the paint, thus eliminating fogging at the edge of the paint line, as well as afterwiping or buffing-off of overspray.

The Conforming Matrix Electro-Formed Masking Template is available in three general types; namely, a lip type, plug type, and block cut-out plane surface type. By means of special arches bridging, the "loose" insides of letters and numerals, such as "0" and "6," are held in position to effect accurate characters. The plug type mask is intended for use on plastic products where side lighting is employed to illuminate clean depressed characters such as speedometer and radio dials. The plug type mask is also applicable to plastics molded in solid color but to be decorated with additional colors on the face surfaces.

With the Conforming Matrix Masking Template, the majority of parts can be painted by laying them on a turntable and placing the mask on same. If desired, the mask also can be rigidly mounted in the spray booth and the piece brought to the mask. However, where parts have a tendency to warp or their light weight and size allows distortion

Conforming Matrix Electro-Formed Metal Masking Template

Free!

•

Attractive Granium descriptive folder; included are actual silver plated samples to show advantages of using Granium in silver plating.

•

Tells how you, too, can cut silver plating costs by using amazing new Granium "B" Cyanide!

ADDRESS DEPT. P-3

GRANIUM-GRAY

Products

6100 E. WASHINGTON BLVD.
E. LOS ANGELES 22, CALIF.

ALLWOOD

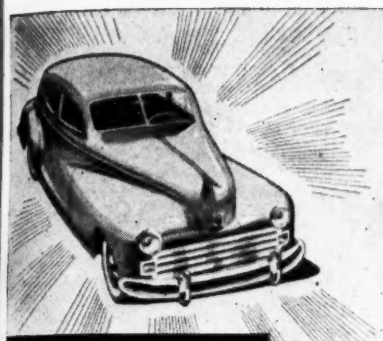
"Vienna Brand" Lime

Made from Limestone that is identical in chemical analysis and geological structure with European Imported Lime. Tests show a "lime cake" made from Allwood "Vienna Brand" Lime equals the finish made from imported lime.

WRITE FOR FULL PARTICULARS

ALLWOOD LIME COMPANY

Manitowoc • Wisconsin

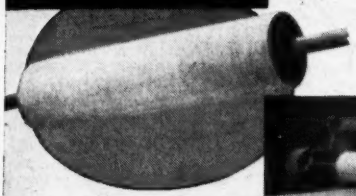


This Beauty was once a rough, burr-ridden sheet of steel

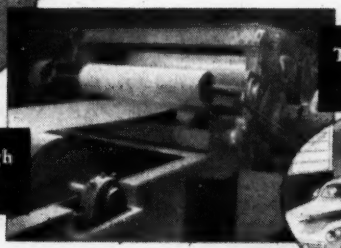
HERE'S WHAT HAPPENED:

Before this beauty rolled out of the factory, a large part of it had to be thoroughly brushed by one or more hardy Pittsburgh Power-Driven Brushes. Unbelievable that this gleaming body you see was once a burr-ridden, rough sheet of steel. Then Pittsburgh Brushes went to work to produce this smooth steel of beauty.

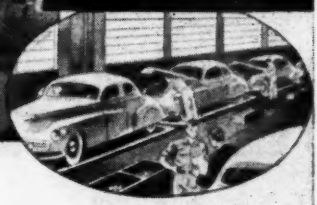
This is the Pittsburgh Brush that did the job



This is how the Pittsburgh Brush does the job



This is what the Pittsburgh Brush helped to build



There's a Brush by Pittsburgh for Every Industrial Use—

GLASS	AUTOMOBILE	TIRE & RETREADING
STEEL	RUBBER	SHOE MANUFACTURING
PLASTICS	PAPER	& REPAIRING

In the complete Pittsburgh line are brushes of all types, including "Perfect Balance" sections, wheels and assemblies. Uni-fill scratch brushes as well as paint and other maintenance brushes. Consult the Pittsburgh engineering representative. He will gladly work with you in developing any type of power-driven brushes to meet your particular finishing specifications.

Use only Power-Driven Brushes By Pittsburgh—it pays

Specifically engineered to do your particular finishing requirements—the perfect balance of Pittsburgh's Brushes carefully controls distribution of the brushing stock. Perfect balance—maximum efficiency. You can depend on Brushes by Pittsburgh for top performance, enduring economy—and a minimum loss of time in change-overs.

Power Driven **BRUSHES**

PPG

BRUSHES · PAINT · GLASS · CHEMICALS · PLASTICS

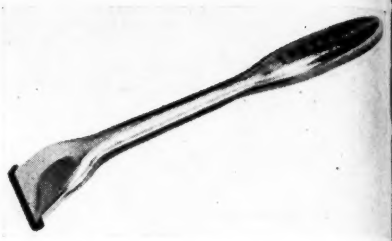
PITTSBURGH PLATE GLASS COMPANY

from polishing, clamping fixtures are recommended for use with the mask, which is also designed for attaching to parts moving on a monorail or merry-go-round for either manual or fully automatic spraying.

Carboloy "Red Devil" Paint Scraper

Developed by the Carboloy Co., Inc., and manufactured and distributed by Red Devil Tools, Irvington, N. J., the Carboloy "Red Devil" Paint Scraper illustrated herewith is designed to remove all kinds of paints, lacquers, hard enamels, and so on, from both flat and curved wood and metal surfaces with unusual ease.

The scraper includes a specially-designed easily-adjustable Carboloy cemented carbide blade, which provides for an unusually fast and clean scraping action and long life. The blade has four working edges and four individually shaped corners which are said to afford the scraper a wide range of application. Even though the carbide blade is considerably harder than any surface on which it may be used, the blade, it is claimed, will not injure the working surface due to its position in the holder.

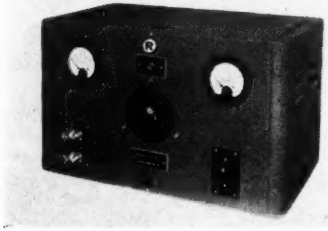


Carboloy "Red Devil" Paint Scraper

Kano Rust-Proof Coating

Designated as Kano Rust-Proof, a temporary, removable rust preventive which is designed to provide a thin clear film when deposited on metal surfaces is now being marketed by Kano Laboratories, 7[illegible] E. Wacker Drive, Chicago 1, Ill. According to the manufacturer, the material can be applied cold by the dip, spray, or brush method and dries in approximately

NEW HIGH VOLTAGE SELENIUM RECTIFIER



Model No. 5515—50 amperes
0-15 volts
Price f.o.b. $175.

Rapid Model 5515 features extra large full wave bridge Selenium Rectifier Stack. Voltmeter and Ammeter accurately calibrated from 0 to 15 volts. Positive input and output dual overload control. Complete heavy duty input line and plug eliminates installation problems. Requires only 12" x 20" of bench space.

Other Rapid models ranging from 25 to 500 amperes for single and three-phase service available. Write for complete information.

RAPID ELECTRIC CO.
2847 Middletown Rd. Bronx 61, N. Y.

Brother • do I last longer!

Only replace me every 4 or 5 years.

Pat. Pe[illegible]

• How often do you have to replace lead alloy anodes? M Sterling Conducta-Core Lead Alloy Anodes last *much* longer. They are *dated*, proof of their long life. Use M Sterling Anodes . . . their "good points" give you every advantage needed for fine production Chromium Plating. And they do not warp, crack, peel, bend, nor scale. Write for details on this *Oomph* Anode.

***Metallurgical* Products Co.**
Established 1909
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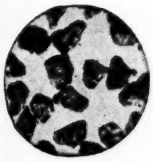
CT BOROLON

Sharp—angular—uniform—pure and dust-free ideal for general polishing with glue or cement. Full size range for every job from roughing to fine finishing.

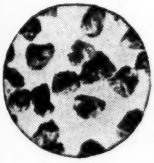


T BOROLON

Sharp edged—angular—retains cutting action. Holds well. Sizes for all polishing jobs.

B BOROLON

Blocky—easy to set-up. Packs well on wheel head. Wide size range for heavy duty production work.



TB BOROLON

Extra strong bond between grain and adhesive. Various sizes for heavy duty production work requiring coarse grain.

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Philadelphia, Pa

Electric Furnace Plant, Simonds Canada Abrasive Co., Ltd., Arvida, P.Q.

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BOROLON GRAINS

for *All* polishing operations

Simonds Abrasive Company's quality-controlled Borolon Grain is fused crystalline aluminum oxide. It is available in the types shown at the left, specially processed to give you fast, economical results.

Borolon produced as crude abrasive in the electric furnaces of our subsidiary company Simonds Canada Abrasive Company Ltd., is specially processed into hard, tough, long acting grain for top results on all polishing operations.

Write for Data Sheet, Form ESA 59, and ask for samples of Borolon grain in sizes you desire.

SIMONDS ABRASIVE COMPANY TACONY & FRALEY STREETS PHILADELPHIA 37, PA.

15 minutes to a hard surface which is tough, flexible, and non-porous and has the capacity of creeping under and displacing moisture, fingerprints, and so on, thus avoiding spotty rust on polished surfaces due to handling.

Kano Rust-Proof Coating, it is claimed, can be removed with any petroleum solvent although it is not necessary to remove the material prior to painting. The material can be applied to hand tools where it is said to avoid considerable loss in preventing rust, and is also suitable for preventing corrosion on raw stocks and finished parts, as well as for application to polished and ground surfaces on machines. Kano Rust-Proof Coating is available in containers of from 1 to 55 gallons.

Multilift Model S Magnetic Separator

Designed as the Multilift Model S, a load-releasing, lightweight, adjustable hand magnet of the permanent (non-electric) type has been introduced for the rapid handling of steel by the Multifinish Manufacturing Co., 2114 Monroe Ave., Dept. 173, Detroit 7, Mich. Completely self-powered and requiring no current, wires, or batteries, the unit is constructed for operation with one hand and is designed to lift up to 15 lb. The load is said to be instantly released when a finger-tip lever is raised.

Within the moisture-proof aluminum and stainless steel case of the Multilift Model S Magnetic Separator are two 4-inch Alnico magnets which, it is claimed, will not lose their power regardless of

Multilift Model S Magnetic Separator

the kind or length of use. The unit measures 3 x 5½ x 8 inches in size and weighs 3¾ lb. It is recommended for use in drawing steel parts from tumbling media; handling nuts, bolts, screws, nails and small parts; separating stacked steel strips; removing heat-treated parts from carbon; handling hot or cold parts; separating steel from non-ferrous materials of many kinds; and salvaging steel parts or particles from aisles and assembly lines.

Correction

The report "Galvanic Corrosion of Dissimilar Metals as Applied to Gas Hot Water Storage Heaters" issued by the American Gas Association, 420 Lexington Ave., New York 17, N. Y., and described on Page 94 of the March 1948 issue of PRODUCTS FINISHING, is available at 75 cents per copy rather than gratis as mentioned in the write-up.

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The finest grade solids, and cotton content, excellent gloss, tough and non-blushing; excellent adhesion, non-bleeding, free from dyes, asphalts, scap film and naphthas. For best results, reduce 25% with lacquer thinner. Hi-Gloss Lacquer is of low viscosity, resists acids, alkalies and alcohol. **In Drums, $1.95 per gal.**

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